EPA/ROD/R08-90/039
1990

EPA Superfund
Record of Decision:

ROCKY MOUNTAIN ARSENAL (USARMY)
EPA ID: CO5210020769
OU 19
ADAMS COUNTY, CO
02/26/1990

Text:
(A) STATE THE OBJECTIVE OF THE IRA;
(B) DISCUSS (INTERIM RESPONSE ACTION) ALTERNATIVES, IF ANY, THAT WERE CONSIDERED; (C) PROVIDE THE RATIONALE FOR THE ALTERNATIVE SELECTED; (D) PRESENT THE ARMY'S FINAL ARAR DECISION; (E) SUMMARIZE THE SIGNIFICANT COMMENTS RECEIVED REGARDING THE ALTERNATIVES ASSESSMENT FOR THIS IRA AND THE ARMY'S RESPONSE TO THOSE COMMENTS; AND (F) ESTABLISH AN IRA DEADLINE FOR COMPLETION OF THE IRA, IF APPROPRIATE.

EACH OF THE ABOVE ISSUES IS ADDRESSED IN THIS DOCUMENT. COMMENTS REGARDING THE DRAFT FINAL ALTERNATIVES ASSESSMENT FOR OTHER CONTAMINATION SOURCES INTERIM RESPONSE ACTION, RAIL CLASSIFICATION YARD, (SHELL 1989A) WERE ADDRESSED IN WRITTEN RESPONSES PREVIOUSLY SENT TO THE PARTIES AND ARE SUBSTANTIVELY INCORPORATED INTO THIS DOCUMENT, WHERE APPROPRIATE.

FOR THIS REPORT, THE TERM "STRATEGY" REFERS TO FUNDAMENTAL CONCEPTUAL SCHEMES OF GENERAL RESPONSE ACTIONS (E.G. NO ACTION, GROUNDWATER INTERCEPTION/CONTAINMENT, IN-SITU REMEDIATION, CAPPING, AND EXCAVATION AND TREATMENT). A "SYSTEM" IS A SPECIFIC CONCEPTUAL DESIGN THAT ACHIEVES THE SELECTED STRATEGY (E.G. AN INTERCEPT SYSTEM ACHIEVES THE STRATEGY OF CONTAINMENT OF GROUNDWATER). A SYSTEM IS COMPOSED OF ONE OR MORE TECHNOLOGIES (E.G. A LINE OF PUMPING WELLS MAY FORM AN INTERCEPT SYSTEM). IN THIS DOCUMENT, ALTERNATIVE STRATEGIES ARE ASSESSED, AND A PREFERRED STRATEGY SELECTED, USING CRITERIA OUTLINED IN THE FEDERAL FACILITY AGREEMENT (1989). BASED ON THIS ASSESSMENT A PREFERRED STRATEGY IS SELECTED IN SECTION 4.0. ALTERNATIVE TECHNOLOGIES AND THEIR IMPACTS ON COST ANALYSES OF SPECIFIC SYSTEMS ARE ALSO BRIEFLY DISCUSSED IN SECTION 4.0. SINCE ENGINEERING QUALITY DATA ARE NEEDED TO ASSESS THEM, SOME SPECIFIC TECHNOLOGIES ARE NOT SELECTED IN THIS DOCUMENT. INSTEAD, THEY WILL BE SELECTED IN THE PRELIMINARY ENGINEERING AND IMPLEMENTATION PLAN DOCUMENTS THAT WILL BE PRODUCED SUBSEQUENT TO THIS REPORT.

TECHNOLOGIES ARE COMBINED INTO SYSTEMS WHICH ARE BELIEVED TO BE CAPABLE OF ACHIEVING THE IRA OBJECTIVE. THESE SYSTEMS ARE ALSO PRESENTED AND EVALUATED IN SECTION 4.0. A CHRONOLOGY OF EVENTS REGARDING THE RAILYARD IRA IS PRESENTED IN SECTION 5.0. THE IRA PROCESS IS DESCRIBED IN SECTION 6.0. A SUMMARY OF THE SELECTED IRA ALTERNATIVE IS CONTAINED IN SECTION 7.0. THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) FOR THIS IRA ARE CONTAINED IN SECTION 8.0. THE IRA SCHEDULE IS PRESENTED IN SECTION 9.0. THE CONSISTENCY WITH THE FINAL RESPONSE ACTION IS STATED IN SECTION 10.0.

THE FINAL ALTERNATIVE ASSESSMENT FOR THE MOTOR POOL AREA IRA (WOODWARD-CLYDE 1989) PROPOSES THAT A GROUNDWATER INTERCEPTION SYSTEM BE CONSTRUCTED TO INTERCEPT TRICHLOROETHYLENE (TCE) NORTH OF THE MOTOR POOL AREA. THE DOCUMENT ALSO PROPOSES THAT THE INTERCEPTION SYSTEM BE IMPLEMENTED IN CONJUNCTION WITH THE RAIL CLASSIFICATION YARD IRA. THE REASONS FOR THIS PROPOSAL ARE DISCUSSED IN SECTION 7.0.

#STD
SITE DESCRIPTION

SECTION 2.0 PROVIDES A SUMMARY OF THE PHYSICAL SETTING OF THE RAIL CLASSIFICATION YARD. ADDITIONAL INFORMATION ON SITE CHARACTERISTICS ARE PROVIDED IN EBASCO (1988A, 1989). THE SITE CHARACTERIZATION WAS IMPROVED SIGNIFICANTLY BY INFORMATION OBTAINED FROM FIELD INVESTIGATIONS ASSOCIATED WITH THE PREPARATION OF THE ALTERNATIVES ASSESSMENT FOR THIS IRA. THIS INFORMATION IS PRESENTED IN SHELL (1989B).

#LAH

LOCATION AND HISTORY

THE ROCKY MOUNTAIN ARSENAL, LOCATED NORTHEAST OF DENVER COLORADO, BECAME A SITE OF MILITARY CHEMICAL AGENT MANUFACTURING BY THE US ARMY IN 1942. PESTICIDES WERE MANUFACTURED AT THE SITE BY LESSEES BEGINNING IN 1946. THE COMPOUND 1,2-DIBROMO-3-CHLOROPROPANE (DBCP), A PESTICIDE MANUFACTURED BY SHELL CHEMICAL COMPANY, HAS BEEN FOUND IN ALLUVIAL GROUNDWATER NEAR THE RAIL CLASSIFICATION YARD IN SECTION 3 OF THE RMA. THE CONTAMINATED GROUNDWATER FORMS A PLUME EXTENDING APPROXIMATELY FROM THE RAILYARD AREA TO THE IRONDALE CONTROL SYSTEM (ICS) NEAR THE NORTHWEST CORNER OF SECTION 33 (FIGURE 2-4).

TO PREVENT OFF-POST MIGRATION OF DBCP IN THE ALLUVIAL GROUNDWATER, THE IRONDALE CONTROL SYSTEM WAS INSTALLED BY SHELL AND BECAME OPERATIONAL IN 1981. SINCE ITS STARTUP, THE IRONDALE CONTROL SYSTEM HAS BEEN EFFECTIVE IN PREVENTING OFF-POST MIGRATION OF DBCP (SHELL 1989C).

GEOLOGY AND HYDROLOGY

REGIONAL GEOLOGIC AND HYDROLOGIC CONDITIONS AT THE RMA HAVE BEEN DISCUSSED IN DETAIL IN PREVIOUS REPORTS (MAY 1982, MORRISON-KNUDSEN ENGINEERS (MKE) 1987, AND EBASCO 1989) AND ARE NOT REPEATED HERE. THE TWO PERTINENT STRATIGRAPHIC UNITS UNDERLYING THE RAILYARD ARE THE QUATERNARY ALLUVIUM AND DENVER FORMATION. THE ALLUVIUM UNDERLYING THE RAILYARD THICKENS FROM 65 TO 110 FEET FROM SOUTH TO NORTH AND IS COMPRISED PRIMARILY OF WELL-GRADED SAND AND GRAVELLY SAND, WITH MINOR LENSES OF GRAVEL AND LESS PERMEABLE CLAYEY SAND AND CLAY. THE ALLUVIUM IS UNDERLAIN BY RELATIVELY IMPERMEABLE CLAYSTONE AND SHALE OF THE DENVER FORMATION. FIGURE 2-1 IS A CONTOUR MAP OF THE TOP OF THE DENVER FORMATION IN THE RAILYARD AREA.

THE WATER TABLE IN THE ALLUVIUM BENEATH THE RAILYARD VARIES FROM ABOUT 55 TO 75 FEET BELOW THE GROUND SURFACE. THE SATURATED ALLUVIAL THICKNESS VARIES FROM ABOUT 15 FEET BENEATH THE SOUTHERN PORTION OF THE RAILYARD TO ABOUT 40 FEET BENEATH THE NORTHERN PORTION OF THE RAILYARD AS SHOWN IN FIGURE 2-2. DATA COLLECTED SINCE 1981 HAVE SHOWN THAT, EXCEPT FOR A RISE OF ABOUT 2 FEET IN 1984, GROUNDWATER LEVELS HAVE REMAINED FAIRLY STABLE, WITH SEASONAL VARIATIONS BEING GENERALLY LESS THAN ONE FOOT.

AS INDICATED BY THE MAP OF THE WATER TABLE (FIGURE 2-3), GROUNDWATER FLOW IN THE AREA IS FROM THE SOUTH TO THE NORTH NORTHWEST. LATERAL HYDRAULIC GRADIENTS RANGE FROM ABOUT 0.02 FEET/FEET IN THE SOUTHERN PORTION OF THE RAILYARD AS SHOWN IN FIGURE 2-3 TO ABOUT 0.006 FEET/FEET IN THE NORTHERN PORTION. A LONG-TERM INJECTION TEST CONDUCTED IN THE RAILYARD AREA PRODUCED A HYDRAULIC CONDUCTIVITY ESTIMATE FOR THE ALLUVIAL AQUIFER OF APPROXIMATELY 1.6 X (10-3) FEET/SECOND, OR 5 X (10-2) CENTIMETER/SECOND. THE LOCATION OF THE INJECTION TEST WELL IS SHOWN IN FIGURE 2-3. THE UNDERLYING CLAYSTONES AND SHALES OF THE DENVER FORMATION PROBABLY HAVE HYDRAULIC CONDUCTIVITIES A FEW ORDERS OF MAGNITUDE LOWER THAN THOSE OF THE ALLUVIUM. BASED ON AN ESTIMATED EFFECTIVE POROSITY OF 0.35 AND THE ESTIMATED HYDRAULIC CONDUCTIVITY AND GRADIENTS LISTED ABOVE, ESTIMATED AVERAGE ALLUVIAL GROUNDWATER VELOCITIES (I.E., PARTICLE VELOCITIES) RANGE FROM 2.4 TO 8.1 FEET/DAY.

GROUNDWATER RECHARGE IN THE RAILYARD AREA IS LIMITED TO INFILTRATION AND PERCOLATION OF PRECIPITATION. ALTHOUGH DIFFICULT TO QUANTIFY, RECHARGE IN THE RAILYARD AREA IS ENHANCED BY THE EXISTENCE OF COBBLE BALLAST BENEATH THE TRACKS, WHICH ALLOWS FOR RAPID INFILTRATION AND REDUCES EVAPOTRANSPIRATION BY SHADING THE SOILS AND INHIBITING VEGETATIVE GROWTH. THIS WAS EVIDENCED BY THE PRESENCE OF MOIST SOILS BENEATH THE BALLAST DURING THE WINTER AND SUMMER OF 1989. PORE PRESSURE DATA FROM CONE PENETRATION TESTING ALSO SHOWED A HIGH MOISTURE CONTENT IN THE

VADOSE ZONE BENEATH THE BALLAST.

EXTENT OF CONTAMINATION

SOIL AND WATER QUALITY DATA COLLECTED IN THE RAILYARD AREA WERE COMPILED AND PRESENTED IN THE WESTERN STUDY AREA REPORT (EBASCO 1989). ADDITIONAL WATER QUALITY AND SOILS DATA WERE COLLECTED BY MK-ENVIRONMENTAL SERVICES AND PRESENTED IN THE ALTERNATIVES ASSESSMENT FOR THIS IRA (SHELL 1989B). COLLECTIVELY, THESE REPORTS PRESENT EXTENSIVE DATA FROM ALLUVIAL WATER QUALITY MONITORING WELLS, SOIL GAS STUDIES, AND CONE PENETROMETER INVESTIGATIONS (CONE PENETRATION TESTING (CPR) AND GROUNDWATER SAMPLING AND ANALYSIS). THESE DATA HAVE DOCUMENTED THE PRESENCE OF DBCP AND OTHER COMPOUNDS IN THE SOIL AND GROUNDWATER UNDERLYING THE RAILYARD AREA. ALTHOUGH OTHER COMPOUNDS EXIST IN ALLUVIAL GROUNDWATER BENEATH THE RAILYARD AREA, DBCP IS THE ONLY COMPOUND THAT HAS BEEN CONSISTENTLY FOUND IN THE GROUNDWATER IN CONCENTRATIONS GREATER THAN ARARS. A BRIEF SUMMARY OF THE CONCLUSIONS FROM THESE REPORTS IS CONTAINED IN THIS SECTION OF THE DECISION DOCUMENT. FOR A MORE DETAILED PRESENTATION AND ANALYSES OF THESE DATA, REFER TO THE REFERENCED DOCUMENTS.

GROUNDWATER QUALITY DATA HAVE SHOWN A PLUME OF DBCP EXTENDING NORTHWARD FROM THE RAILYARD TOWARD THE IRONDALE CONTROL SYSTEM (FIGURE 2-4). FIGURE 2-5 SHOWS THE DISTRIBUTION OF DBCP IN GROUNDWATER COLLECTED FROM WELLS AND CPT HOLES NEAR THE RAILYARD.

AS DOCUMENTED IN SHELL (1989B), SOIL GAS INVESTIGATIONS HAVE SHOWN DBCP IN THE SURFICIAL SOILS BENEATH THE NORTHERN PORTIONS OF TRACKS 1 THROUGH 6 (THE WESTERNMOST SIX TRACKS) IN THE RAILYARD. CONCENTRATIONS WERE AS HIGH AS 2 UG/G. VARIOUS SPILLS OR LEAKS OF DBCP IN THE RAILYARD ARE THOUGHT TO HAVE MIGRATED EITHER IN THE LIQUID OR VAPOR PHASE THROUGH THE VADOSE ZONE TO THE ALLUVIAL AQUIFER, THUS ACTING AS SOURCES OF THE DBCP PLUME.

AS SHOWN IN FIGURE 2-5, THE EASTERN AND WESTERN LIMITS OF THE DBCP PLUME IN THE RAILYARD AREA DEFINE A PLUME THAT IS ALMOST 500 FEET WIDE. BASED ON THE ESTIMATES OF AQUIFER PROPERTIES IN THE NORTHERN PORTION OF THE RAILYARD (I.E. SATURATED ALLUVIAL THICKNESS OF 37.5 FEET, HYDRAULIC GRADIENT OF 0.0074 FEET/FEET, AND HYDRAULIC CONDUCTIVITY OF 5 X (10-2) CENTIMETER/SECOND), THE ESTIMATED ALLUVIAL FLOW WITHIN THE DBCP PLUME IS APPROXIMATELY 100 GALLON PER MINUTE. THE ESTIMATED AVERAGE GROUNDWATER FLOW VELOCITY VARIES FROM ABOUT 2.4 TO 8.1 FEET/DAY IN THE ALLUVIAL AQUIFER UNDERLYING THE RAILYARD. THE CONFIGURATION OF THE UPGRADIENT END OF THE PLUME IS INTERPRETED TO HAVE FINGERS OF CONTAMINATION EMANATING FROM SEVERAL SMALL SOURCES OF DBCP IN THE RAILYARD.

CONCENTRATIONS OF DBCP IN THE ALLUVIAL GROUNDWATER CONSISTENTLY DECREASE WITH DEPTH (SHELL 1989B). THIS DECREASE MAY INDICATE THAT THE SOURCES OF DBCP CONTAMINATION ARE EITHER RESTRICTED TO THE UPPERMOST PORTION OF THE ALLUVIAL AQUIFER OR LOCATED ABOVE THE WATER TABLE IN OVERLYING UNSATURATED SEDIMENTS. CONCENTRATIONS OF DBCP IN THE GROUNDWATER BENEATH THE RAILYARD HAVE ALSO BEEN DECREASING WITH TIME SINCE PEAKING IN 1984 (SHELL 1989B). IT IS NOT KNOWN WHETHER THIS TREND WILL CONTINUE.

INVESTIGATIONS HAVE LED TO THE CONCLUSION THAT THE SOURCES OF DBCP IN GROUNDWATER ARE UNSATURATED SOILS AND SEDIMENTS CONTAMINATED WITH DBCP, POSSIBLY BY LEAKAGE FROM RAILCARS (SHELL 1989B). EXISTENCE OF A LARGE MASS OF RESIDUAL DBCP IN THE AQUIFER SEEMS UNLIKELY SINCE THE SOLUBILITY OF DBCP IS 1,200,000 UG/L, AND THE HIGHEST CONCENTRATION MOST RECENTLY DETECTED IN THE RAILYARD AQUIFER WAS ONLY 12.1 UG/L.

BASED ON RESULTS FROM A SOIL GAS SURVEY, NUMEROUS SITES OF SOIL CONTAMINATION PROBABLY EXIST IN THE RAILYARD AREA. A GOOD CORRELATION

BETWEEN SURFACE SOIL CONTAMINATION AND ALLUVIAL AQUIFER CONTAMINATION HAS NOT BEEN DEMONSTRATED. THIS COULD BE THE EFFECT OF INTRICATE FLOW PATHWAYS FROM THE SURFACE SOILS TO THE ALLUVIAL AQUIFER CAUSED BY THE COMPLEX STRATIGRAPHY (E.G., EXAMPLE, MULTIPLE LENSES OF CLAY AND CLAYEY SAND) AND THICK VADOSE ZONE BENEATH THE RAILYARD.

#IRAO
INTERIM RESPONSE ACTION OBJECTIVE

THE OBJECTIVE OF THE RAIL CLASSIFICATION YARD IRA IS TO LIMIT THE MIGRATION OF DBCP NEAR THE RAILYARD SOURCE AREAS AS SOON AS PRACTICABLE. THE IRA WILL CONCENTRATE ON DBCP SINCE IT IS THE ONLY CONTAMINANT FOUND IN THE AQUIFER UNDERLYING THE RAILYARD WHICH CONSISTENTLY EXCEEDS STANDARDS IDENTIFIED IN ARARS. ALTHOUGH IMPLEMENTING THIS IRA MAY ALSO LIMIT THE MIGRATION OF OTHER CONTAMINANTS AND/OR REDUCE THE TIME PERIOD OVER WHICH THE IRONDALE CONTROL SYSTEM MUST OPERATE, THESE POTENTIAL EFFECTS ARE NOT INCLUDED IN THE IRA OBJECTIVE.

#IRAA
INTERIM RESPONSE ACTION ALTERNATIVES

ALTERNATIVE STRATEGIES

THE STRATEGIES CONSIDERED FOR IMPLEMENTATION IN THE RAIL CLASSIFICATION YARD IRA ARE:

NO ACTION;
GROUNDWATER INTERCEPTION/CONTAINMENT;
IN-SITU REMEDIATION;
CAPPING; AND
EXCAVATION AND TREATMENT.

AS SPECIFIED IN THE FEDERAL FACILITIES AGREEMENT (1989), THE CRITERIA USED TO ASSESS ALTERNATIVE STRATEGIES ARE:

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT;
MITIGATION OF THE THREAT TO HUMAN HEALTH;
REASONABLENESS OF COST;
TIMELINESS;
ATTAIN APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) TO THE MAXIMUM EXTENT PRACTICABLE; AND BE CONSISTENT WITH AND CONTRIBUTE TO THE EFFICIENT PERFORMANCE OF FINAL RESPONSE ACTIONS TO THE MAXIMUM EXTENT PRACTICABLE.

EACH STRATEGY LISTED ABOVE HAS BEEN EVALUATED BASED UPON ITS ABILITY TO MEET THESE CRITERIA.

NO ACTION

INVESTIGATIONS HAVE SHOWN THAT DBCP IS MIGRATING AWAY FROM THE RAILYARD AREA IN THE UNDERLYING ALLUVIAL AQUIFER. THE NO ACTION ALTERNATIVE HAS BEEN ELIMINATED AS A PREFERRED STRATEGY FOR THIS IRA BECAUSE IT DOES NOT MEET THE SPECIFIC IRA OBJECTIVE FOR THIS SITE OF LIMITING MIGRATION OF DBCP NEAR THE SOURCE AREA AS SOON AS PRACTICABLE.

GROUNDWATER INTERCEPTION/CONTAINMENT

THE GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY WOULD INHIBIT THE MOVEMENT OF DBCP-CONTAMINATED GROUNDWATER AWAY FROM THE RAILYARD AREA. BY DEFINITION, IT MEETS THE IRA OBJECTIVE AND THE CRITERION OF REDUCING WASTE MOBILITY.

A GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY PROTECTS HUMAN HEALTH AND THE ENVIRONMENT, AND MITIGATES THE THREAT TO HUMAN HEALTH BY INHIBITING MIGRATION OF DBCP. THE STRATEGY IS EXPECTED TO BE IMPLEMENTABLE IN A TIMELY MANNER (THREE YEARS OR LESS) USING PROVEN TECHNOLOGIES. IMPLEMENTATION OF THE GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY IS EXPECTED TO COST APPROXIMATELY $3,000,000 OR LESS (SEE SECTION 4.3 FOR COST ESTIMATES) WHICH IS MUCH MORE REASONABLE THAN THE IMPLEMENTATION COSTS OF THE OTHER STRATEGY THAT MEETS THE IRA OBJECTIVE (SEE SECTION 4.1.5). IT IS EXPECTED THAT A GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY CAN BE IMPLEMENTED IN THE RAILYARD AREA TO ACHIEVE SUBSTANTIVE COMPLIANCE WITH ARARS (PRESENTED IN SECTION 8.0). IT IS NOT UNREASONABLE TO ASSUME THAT GROUNDWATER INTERCEPTION/CONTAINMENT IS CONSISTENT WITH AND CONTRIBUTES TO THE EFFICIENT PERFORMANCE OF FINAL RESPONSE ACTIONS BY CONTAINING MIGRATION CLOSER TO THE SOURCE AND AWAY FROM THE BOUNDARIES OF THE RMA (SEE SECTION 10.0).

IN SUMMARY, A GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY FULFILLS ALL THE ASSESSMENT CRITERIA FOR INTERIM RESPONSE ACTIONS AND HAS BEEN SELECTED AS THE PREFERRED STRATEGY FOR THE RAIL CLASSIFICATION YARD IRA.

IN-SITU REMEDIATION

THREE TYPES OF IN-SITU REMEDIATION HAVE BEEN CONSIDERED FOR IMPLEMENTATION AS THE RAIL CLASSIFICATION YARD IRA. THESE TYPES ARE BIODEGRADATION, HYDROLYSIS, AND FLUSHING/LEACHING. EFFECTIVELY IMPLEMENTING ANY OF THE IN-SITU REMEDIATION STRATEGIES IN THIS IRA WOULD REQUIRE CONSIDERABLY BETTER SOURCE DELINEATION. CONSIDERABLE EFFORT WAS MADE TO DEFINE THE DBCP SOURCE AREAS DURING THE ASSESSMENT PHASE OF THIS IRA. HOWEVER, THE INFORMATION FROM THESE INVESTIGATIONS INDICATES THAT THE IN-SITU IRA STRATEGIES MAY NOT BE EFFECTIVE. THE NUMEROUS, LOW-LEVEL SOURCES OF DBCP FOUND IN THE VADOSE ZONE BENEATH THE RAILYARD, COUPLED WITH THE LITHOLOGIC COMPLEXITIES (I.E., CLAY AND CLAYEY SAND LENSES) POSE PROBLEMS FOR EFFECTIVE IMPLEMENTATION OF IN-SITU TECHNOLOGIES. EVEN A BETTER UNDERSTANDING OF THE LOCATIONS OF DBCP SOURCE AREAS BENEATH THE RAILYARD WOULD BE NECESSARY BEFORE LEACHING COULD BE CONSIDERED A RELIABLE STRATEGY. EACH OF THE IN-SITU REMEDIATION STRATEGIES WOULD ALSO REQUIRE LABORATORY STUDIES AND POSSIBLY FIELD TESTS TO OPTIMIZE THEIR DESIGN. THESE INVESTIGATIONS WOULD BE TIME-CONSUMING AND COULD DELAY IMPLEMENTATION OF THE IRA FOR UP TO A FEW YEARS. CONSEQUENTLY, THESE STRATEGIES DO NOT MEET THE CRITERION OF TIMELINESS. THE ABILITY OF IN-SITU STRATEGIES TO MEET ANY OF THE REMAINING CRITERIA CANNOT BE DETERMINED UNTIL THE LABORATORY AND/OR FIELD TEST PROGRAMS ARE CONDUCTED. FOR THESE REASONS, THE IN-SITU REMEDIATION STRATEGIES HAVE NOT BEEN RETAINED FOR FURTHER CONSIDERATION FOR THE RAIL CLASSIFICATION YARD IRA.

HAVING A SOIL ORGANIC CARBON NORMALIZED PARTITIONING COEFFICIENT (KOC) OF 129 L/KG, DBCP COULD BE EVENTUALLY FLUSHED FROM SOME OF THE SAND AND GRAVEL ZONES UNDERLYING THE RAILYARD AREA. IF A LEACHING SOLUTION HAVING AN ELEVATED PH IS USED, THE COMBINED EFFECTS OF HYDROLYSIS AND FLUSHING MAY PROVIDE SOME NOTABLE EFFECT ON VADOSE ZONE CONTAMINATION. HOWEVER, THE PRESENCE OF SOME CLAYEY SAND AND CLAY LENSES AND THE LACK OF DEFINITION OF THE DBCP SOURCES WOULD COMPLICATE ANY ATTEMPTS TO FLUSH THE VADOSE ZONE. ONE OF THE PROBLEMS CAUSED BY THESE CLAY LENSES IS THE UNDETERMINED EFFECT ON FLOW PATHWAYS OF ANY ADDED LEACHING WATER. IF FLUSHING IS INCREASED SIGNIFICANTLY ABOVE HISTORICAL LEVELS, IT IS IMPOSSIBLE WITH EXISTING LITHOLOGICAL INFORMATION ON THE CLAY LENSES, TO PREDICT THE FLOW PATHS OF THE INCREASED LEACHATE. LOSS OF CONTROL OF THE LEACHATE WOULD BE VERY UNDESIRABLE. CONSEQUENTLY, WITHOUT A MORE DETAILED UNDERSTANDING OF THE LITHOLOGY, IMPLEMENTATION OF AN ENHANCED FLUSHING/LEACHING STRATEGY WOULD NEED TO BE COMBINED WITH SOME KIND OF A CONTAINMENT STRATEGY SIMILAR TO THAT DISCUSSED IN SECTION 4.3.1.

CAPPING

CAPPING MAY REDUCE THE MOBILITY AND MIGRATION RATES OF DBCP IN THE UNSATURATED ZONE BY REDUCING OR ELIMINATING RECHARGE FROM PRECIPITATION. HOWEVER, IF VAPOR-PHASE TRANSPORT IS THE PRINCIPAL MECHANISM OF TRANSPORT INTO THE AQUIFER, CAPPING WOULD HAVE A NEGLIGIBLE EFFECT ON THE MIGRATION OF DBCP INTO GROUNDWATER AND AWAY FROM THE RAILYARD AREA. A SIGNIFICANT AMOUNT OF GROUNDWATER WOULD CONTINUE TO FLOW THROUGH THE ALLUVIAL AQUIFER BENEATH THE RAILYARD REGARDLESS OF WHETHER A CAP IS CONSTRUCTED. THIS FLOW WOULD CONTINUE TO TRANSPORT DBCP FROM THE SITE. FOR THESE REASONS, AN IRA CONSISTING SOLELY OF CONSTRUCTING A CAP OVER THE RAILYARD AREA IS NOT ACCEPTABLE.

CAPPING COULD BE USED IN CONJUNCTION WITH ANOTHER STRATEGY. FOR EXAMPLE, A CAP COULD BE USED IN CONJUNCTION WITH THE GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY DISCUSSED IN SECTION 4.1.2. HOWEVER, THE EFFECTIVENESS OF A GROUNDWATER INTERCEPTION SYSTEM WOULD NOT BE IMPROVED WITH THE ADDITION OF A CAP. IN FACT, ADDING A CAP WOULD REDUCE THE RATE AT WHICH THE VADOSE ZONE WOULD BE CLEANSED BY NATURAL FLUSHING TOWARD THE INTERCEPTION SYSTEM. THE APPARENT TREND OF DECREASING CONCENTRATIONS OF DBCP IN GROUNDWATER MAY BE EVIDENCE THAT SUCH FLUSHING IS BENEFICIAL. ELIMINATING THIS FLUSHING SEEMS UNDESIRABLE IF AN EFFECTIVE GROUNDWATER INTERCEPTION/CONTAINMENT SYSTEM IS CONSTRUCTED NEAR THE DBCP SOURCES.

SINCE CAPPING BY ITSELF WOULD BE INEFFECTIVE, AND WHEN USED IN CONJUNCTION WITH THE PREFERRED STRATEGY OF GROUNDWATER INTERCEPTION/CONTAINMENT APPEARS TO BE COUNTERPRODUCTIVE, IT HAS BEEN ELIMINATED FROM FURTHER CONSIDERATION FOR IMPLEMENTATION UNDER THIS IRA.

EXCAVATION AND TREATMENT

EXCAVATION AND TREATMENT OF CONTAMINATED MATERIALS MAY MEET THE OBJECTIVE OF THE RAIL CLASSIFICATION YARD IRA. HOWEVER, BASED ON EVALUATIONS OF EXISTING DATA, A LARGE AMOUNT OF POTENTIALLY CONTAMINATED SATURATED AND UNSATURATED MATERIALS (APPROXIMATELY 2.8 MILLION CUBIC YARDS) EXIST IN THE RAILYARD AREA. EXCAVATING AND TREATING THIS LARGE VOLUME OF MATERIAL WOULD BE VERY COSTLY, AND IS ESTIMATED AT $90-95 MILLION. ALSO, BECAUSE OF LACK OF KNOWN POINT SOURCES, EXCAVATING AND TREATING A LARGER VOLUME OF SOIL THAN NECESSARY WOULD BE REQUIRED UNLESS THE AREAL AND VERTICAL EXTENT OF THE DBCP SOURCE AREAS ARE MORE RELIABLY DEFINED. THIS WOULD REQUIRE ESTABLISHMENT OF ACTION LEVELS AND EXTENSIVE, HIGHLY DETAILED INVESTIGATIONS, WHICH WOULD DELAY IMPLEMENTATION OF THIS IRA. IMPLEMENTING AN EXCAVATION AND TREATMENT STRATEGY FOR THIS IRA WOULD LIKELY TAKE AT LEAST THREE TO FOUR YEARS OR MORE BECAUSE OF THE REQUIRED INVESTIGATIONS AND THE LARGE AMOUNT OF POTENTIALLY CONTAMINATED SOIL INVOLVED. THE STRATEGY WOULD PROBABLY BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, MITIGATE THE THREAT TO HUMAN HEALTH, ATTAIN ARARS, AND CONTRIBUTE TO THE FINAL REMEDIAL ACTIONS. HOWEVER, WHEN COMPARED TO THE GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY WHICH ALSO MEETS THESE CRITERIA, EXCAVATION AND TREATMENT IS LESS TIMELY AND CANNOT BE IMPLEMENTED FOR A REASONABLE COST. FOR THESE REASONS, EXCAVATION AND TREATMENT HAS BEEN REMOVED FROM FURTHER CONSIDERATION FOR THIS IRA.

#ATSS
ALTERNATIVE TECHNOLOGIES FOR THE SELECTED STRATEGY

AS DESCRIBED IN SECTION 4.1, GROUNDWATER INTERCEPTION/CONTAINMENT IS THE ONLY STRATEGY WHICH MEETS THE IRA OBJECTIVE AND WHICH BEST COMPLIES WITH THE IRA GUIDELINES AS SET FORTH IN THE FEDERAL FACILITY AGREEMENT (I.E., TIMELINESS, REASONABLENESS OF COST, ETC.). THIS SECTION OF THE DECISION

DOCUMENT DISCUSSES POTENTIALLY USEFUL TECHNOLOGIES FOR THIS STRATEGY. SPECIFICALLY, GROUNDWATER EXTRACTION, RECHARGE, BARRIERS, AND TREATMENT ARE DISCUSSED. SINCE ENGINEERING QUALITY DATA ARE SOMETIMES REQUIRED TO CHOOSE BETWEEN THESE TECHNOLOGIES, SPECIFIC TECHNOLOGIES CANNOT ALWAYS BE SELECTED IN THIS DOCUMENT. INSTEAD, THEY WILL BE SELECTED IN THE PRELIMINARY ENGINEERING AND IMPLEMENTATION PLAN DOCUMENTS THAT WILL BE PRODUCED SUBSEQUENT TO THIS REPORT.

GROUNDWATER EXTRACTION

THE HIGH HYDRAULIC CONDUCTIVITY OF THE ALLUVIAL AQUIFER AND RELATIVELY THICK SATURATED ALLUVIUM ARE CONDUCIVE TO EFFICIENT GROUNDWATER EXTRACTION WITH WELLS. EXTRACTION WELLS ARE A PROVEN TECHNOLOGY ON THE RMA, AND CAN BE INSTALLED READILY IN THE RAILYARD AREA. OTHER EXTRACTION METHODS CONSIDERED (E.G., WELL POINTS AND EXTRACTION DRAINS) ARE NOT AS COST-EFFECTIVE AS EXTRACTION WELLS IN THE RAILYARD AREA BECAUSE OF THE SIGNIFICANT DEPTHS TO THE AQUIFER. THESE OTHER METHODS WILL NOT BE CONSIDERED FURTHER. THE REMAINING SECTIONS OF THIS REPORT REFLECT THE SELECTION OF EXTRACTION WELLS AS THE PREFERRED EXTRACTION TECHNOLOGY FOR THIS IRA.

GROUNDWATER RECHARGE

A VARIETY OF RECHARGE OPTIONS ARE POTENTIALLY VIABLE FOR USE IN A GROUNDWATER INTERCEPTION/CONTAINMENT SYSTEM FOR THIS IRA. RECHARGE COULD BE ACCOMPLISHED BY USE OF WELLS, TRENCHES, PITS, OR SHALLOW LEACH FIELDS. THE GENERALLY HIGH PERMEABILITY OF THE ALLUVIAL SEDIMENTS IN THE RAILYARD AREA IS CONDUCIVE TO EFFICIENT RECHARGE OPERATIONS.

RECHARGING WATER IN ALLUVIAL WELLS IS A FEASIBLE OPTION IN THE RAILYARD AREA. RECHARGE WELLS ARE MOST EFFECTIVE IN MORE PERMEABLE AQUIFERS WHERE A LARGE CONTACT AREA WITH THE AQUIFER IS NOT REQUIRED. WHEN PRACTICAL, OTHER RECHARGE METHODS ARE GENERALLY PREFERRED OVER RECHARGE WELLS BECAUSE OF THE HIGH COST, TENDENCY FOR PLUGGING, AND RELATIVELY HIGH MAINTENANCE COSTS OF RECHARGE WELLS. WELLS ARE OFTEN BEST SUITED WHEN THE DEPTH TO THE RECHARGE ZONE IS GREAT, RESULTING IN RELATIVELY HIGH COSTS FOR OTHER RECHARGE TECHNOLOGIES. RECHARGE WELLS HAVE BEEN SUCCESSFULLY USED IN BOUNDARY SYSTEMS ON THE RMA.

RECHARGING WATER IN GRAVEL-FILLED TRENCHES IS A RELATIVELY EFFECTIVE TECHNIQUE. THE LARGE CONTACT AREA BETWEEN TRENCHES AND THE ADJACENT AQUIFER HELPS TO MINIMIZE PLUGGING PROBLEMS AND MAY CONSEQUENTLY MINIMIZE MAINTENANCE COSTS. HOWEVER, BECAUSE OF THE COSTS OF CONSTRUCTING TRENCHES TO GREAT DEPTHS, THEY MAY NOT BE COST-EFFECTIVE WHEN IT IS NECESSARY TO RECHARGE DIRECTLY INTO DEEP ZONES. THIS MAY BE A LIMITATION IN THE RAILYARD AREA WHERE THE ALLUVIAL AQUIFER REACHES DEPTHS OVER 100 FEET. SHALLOW TRENCHES COULD BE FEASIBLE IN THE RAILYARD AREA. THE PERFORMANCE OF SHALLOW TRENCHES IS LARGELY RELATED TO THE VERTICAL PERMEABILITY OF THE SOILS BETWEEN THE BOTTOM OF THE RECHARGE TRENCH AND THE ZONE INTO WHICH RECHARGE IS NECESSARY. IF SHALLOW RECHARGE IS FOUND TO BE ACCEPTABLE IN THIS IRA, THE USE OF RECHARGE TRENCHES IN THE PERMEABLE MATERIALS UNDERLYING THE RAILYARD AREA MAY BE COST-EFFECTIVE.

RECHARGE PITS ARE ESSENTIALLY A SMALLER VERSION OF RECHARGE TRENCHES AND HAVE MOST OF THE SAME ADVANTAGES AND DISADVANTAGES. THEY MAY BE PREFERABLE IF THE EXTRA COST OF CONSTRUCTING LARGER TRENCHES IS NOT WARRANTED BY THEIR EXTRA RECHARGE CAPACITY.

A FINAL ALTERNATIVE FOR RECHARGING WATER IN THE RAILYARD AREA IS THE USE OF SHALLOW LEACH FIELDS. IF GEOLOGIC CONDITIONS ARE FAVORABLE, SHALLOW LEACH FIELDS COULD BE THE LEAST EXPENSIVE RECHARGE METHOD.

IF RECHARGING DIRECTLY INTO THE SATURATED ALLUVIAL ZONE UNDERLYING THE RAILYARD AREA IS CONSIDERED NECESSARY, THE ONLY PRACTICAL METHOD OF ACCOMPLISHING THIS RECHARGE IS WITH THE USE OF ALLUVIAL WELLS. IN THE GENERALLY PERMEABLE MATERIALS OF THE ALLUVIAL AQUIFER, RECHARGE WELLS ARE EXPECTED TO BE MORE EFFECTIVE AND MUCH LESS COSTLY THAN CONSTRUCTING DEEP TRENCHES OR PITS. IF THE FLOWPATH THAT RECHARGE WATER FOLLOWS IS NOT IMPORTANT, SHALLOW TRENCHES, PITS, OR LEACH FIELDS WOULD PROBABLY BE THE MOST COST-EFFECTIVE RECHARGE TECHNOLOGIES AVAILABLE FOR THIS IRA.

GROUNDWATER BARRIERS

GROUNDWATER BARRIERS CAN BE USED TO STOP OR INHIBIT THE FLOW OF GROUNDWATER. TWO GENERAL TYPES OF BARRIERS HAVE RELEVANCE TO THIS IRA: PHYSICAL BARRIERS AND HYDRAULIC BARRIERS. IN ORDER TO INTERCEPT OR CONTAIN THE CONTAMINATED GROUNDWATER FLOWING FROM THE RAILYARD AREA, AT LEAST ONE OF THESE TYPES OF BARRIERS IS NEEDED.

PHYSICAL BARRIERS PLACED BELOW GROUND TO INHIBIT AND/OR REDIRECT GROUNDWATER FLOW CAN BE MADE OF A VARIETY OF MATERIALS. SOIL-BENTONITE SLURRY WALLS ARE COMMONLY USED AND HAVE BEEN USED SUCCESSFULLY ON THE RMA. OTHER TYPES OF SLURRY WALLS ARE SOMETIMES USED IN CONDITIONS REQUIRING SPECIAL MATERIALS, USUALLY AT A GREATER COST THAN THAT OF A SIMPLE SOIL-BENTONITE WALL. SLURRY WALLS CAN BE CONSTRUCTED ECONOMICALLY AT DEPTHS DOWN TO ABOUT 70 FEET. AT GREATER DEPTHS, THE COST OF CONSTRUCTING SLURRY WALLS INCREASES DISPROPORTIONATELY WITH THE INCREASE IN DEPTH. EVEN WITH THESE INCREASES, SLURRY WALLS MAY STILL BE MORE COST-EFFECTIVE THAN OTHER ALTERNATIVES. SHEET PILES CAN ALSO BE DRIVEN INTO PLACE TO CREATE A GROUNDWATER FLOW BARRIER. IN LARGE INSTALLATIONS AND AT DEPTHS SUCH AS THOSE IN THE RAILYARD AREA, SHEET PILES ARE GENERALLY NOT AS COST-EFFECTIVE AS A SIMPLE SOIL-BENTONITE SLURRY WALL. DEEP SOIL MIXING (DSM) IS ANOTHER TECHNOLOGY THAT CAN BE USED TO CONSTRUCT A PHYSICAL GROUNDWATER BARRIER. DSM IS A SOIL IMPROVEMENT TECHNIQUE THAT DOES NOT REQUIRE EXCAVATION OR SOIL REMOVAL. HYDRAULICALLY DRIVEN MIXING PADDLES AND AUGERS ARE DRILLED INTO THE GROUND. THE AUGERS AND PADDLES MIX THE NATIVE SOILS WITH STABILIZING AGENTS OR OTHER FLUIDS WHICH ARE FED THROUGH THE CENTER OF EACH SHAFT. THE RESULTING COLUMN OF MIXED SOIL HAS A LOW PERMEABILITY. A ROW OF OVERLAPPING COLUMNS CAN BE CONSTRUCTED TO FORM A BARRIER WALL. THE COST OF DSM IS GENERALLY GREATER THAN THAT OF A SOIL-BENTONITE SLURRY WALL.

A HYDRAULIC BARRIER IS CREATED BY MANIPULATING THE WATER TABLE SUCH THAT NO FLOWPATHS EXTEND THROUGH THE DESIRED BARRIER. BY STRATEGICALLY EXTRACTING AND/OR INJECTING GROUNDWATER, THE WATER TABLE BENEATH THE RAILYARD AREA COULD BE CONFIGURED SO THAT ALL CONTAMINATED GROUNDWATER IN THE DBCP PLUME IS INTERCEPTED BY AN EXTRACTION SYSTEM. SUCH A HYDRAULIC BARRIER CAN RESULT IN AN EFFECTIVE GROUNDWATER BARRIER AS HAS BEEN DEMONSTRATED BY THE IRONDALE CONTROL SYSTEM WHICH USES THIS TECHNIQUE. ONE DISADVANTAGE OF THIS TECHNIQUE IS THAT A SIGNIFICANTLY GREATER AMOUNT OF WATER MUST GENERALLY BE EXTRACTED, TREATED, AND REINJECTED THAN EXISTS IN THE CONTAMINATED PLUME. IN ORDER TO REDUCE THIS RECIRCULATION, A PHYSICAL BARRIER MAY BE PLACED BETWEEN THE EXTRACTION AND RECHARGE FACILITIES. IN SUCH CASES, THE SLURRY WALL COST MAY BE PARTLY OR WHOLELY OFFSET BY THE SAVINGS INCURRED BY REDUCING OR ELIMINATING RECIRCULATION IN THE HYDRAULIC BARRIER.

GROUNDWATER TREATMENT

OPERATING EXPERIENCE WITH THE IRONDALE CONTROL SYSTEM AND OTHER BOUNDARY CONTROL SYSTEMS ON THE RMA DEMONSTRATES THAT CARBON ADSORPTION CAN COST-EFFECTIVELY REMOVE DBCP IN THE CONCENTRATIONS PRESENT BENEATH THE RAILYARD TO UNDETECTABLE LEVELS. UTILIZING OTHER TREATMENT PROCESSES WOULD REQUIRE CONSIDERABLE LABORATORY TREATABILITY STUDIES AND PILOT TESTING TO DEMONSTRATE THEIR FEASIBILITY AND EFFECTIVENESS.

CONSEQUENTLY, THE CONSIDERATION AND EVALUATION OF OTHER GROUNDWATER TREATMENT PROCESSES IS NEITHER NECESSARY NOR CONSISTENT WITH THE CRITERION OF TIMELY IMPLEMENTATION OF THIS IRA. THE REMAINING SECTIONS OF THIS REPORT WERE PREPARED BASED UPON THE SELECTION OF CARBON ADSORPTION AS THE PREFERRED GROUNDWATER TREATMENT TECHNOLOGY FOR THIS IRA.

#ASSS
ALTERNATIVE SYSTEMS FOR SELECTED STRATEGY

WITHIN THE GROUNDWATER INTERCEPTION/CONTAINMENT STRATEGY SELECTED IN SECTION 4.0 OF THIS REPORT, FIVE ALTERNATIVE SYSTEMS AND SYSTEM CONFIGURATIONS HAVE BEEN CONSIDERED FOR IMPLEMENTATION AS THE RAIL CLASSIFICATION YARD IRA. EACH OF THESE SYSTEMS IS COMPOSED OF TECHNOLOGIES DISCUSSED IN SECTION 4.2 OF THIS REPORT. DESCRIPTIONS AND EVALUATIONS OF THESE FIVE SYSTEMS ARE SUMMARIZED IN THIS SECTION OF THE DECISION DOCUMENT.

THE ESTIMATED FLOWRATES REQUIRED FOR SUCCESSFULLY OPERATING THE VARIOUS SYSTEMS PRESENTED IN THIS SECTION ARE BASED ON PRELIMINARY NUMERICAL SIMULATIONS USING THE HYDRAULIC CONDUCTIVITY ESTIMATE (5.0 X (10-2) CM/SEC) FROM THE LONG-TERM INJECTION TEST CONDUCTED ADJACENT TO THE CONTAMINATED PLUME THAT WAS DISCUSSED PREVIOUSLY. AS FUTURE INVESTIGATIONS IMPROVE THE AQUIFER PARAMETER ESTIMATES, NEW FLOW ESTIMATES WILL BE DEVELOPED. IF ESTIMATED AQUIFER PARAMETERS CHANGE SIGNIFICANTLY, THE GROUNDWATER INTERCEPTION/CONTAINMENT SYSTEM RECOMMENDED IN THIS DOCUMENT MAY NEED TO BE RECONSIDERED. NEVERTHELESS, THE RELATIVE DIFFERENCES BETWEEN ESTIMATED FLOWRATES PRESENTED IN THIS DOCUMENT ARE PROBABLY QUITE REALISTIC.

EACH OF THE FIVE ALTERNATIVE SYSTEMS DISCUSSED IN THIS SECTION REQUIRES THE TREATMENT OF CONTAMINATED GROUNDWATER. AS STATED IN SECTION 4.2.4, THE SELECTED TREATMENT TECHNOLOGY IS CARBON ADSORPTION. PRELIMINARY INVESTIGATIONS INTO THE IRONDALE CONTROL SYSTEM TREATMENT PLANT (WHICH UTILIZES CARBON ADSORPTION) INDICATE IT MAY BE ABLE TO TREAT UP TO 300 GPM OR MORE FROM THE RAIL CLASSIFICATION YARD IRA, WITH SOME RELATIVELY ECONOMICAL MODIFICATIONS. CONSTRUCTION OF A NEW CARBON ADSORPTION SYSTEM CAPABLE OF HANDLING THE RANGE OF FLOWS EXPECTED FROM THE RAILYARD IRA (APPROXIMATELY 50 TO 300 GPM FOR THE VARIOUS ALTERNATIVES DISCUSSED BELOW) IS ESTIMATED TO COST BETWEEN $800,000 AND $2,300,000. COST ANALYSES SHOW THAT FOR THE ESTIMATED FLOWRATES FROM THE VARIOUS ALTERNATIVE SYSTEMS, MODIFYING AND USING THE ICS TREATMENT PLANT IS MORE COST-EFFECTIVE THAN CONSTRUCTING AND OPERATING NEW FACILITIES IN THE RAILYARD VICINITY. ADDITIONALLY, USE OF A CENTRALIZED TREATMENT FACILITY HAS AN INHERENT BENEFIT OVER CONSTRUCTING AND OPERATING A NEW, COMPLETELY SEPARATE FACILITY. FOR THESE REASONS, IT IS ASSUMED THROUGHOUT THE REST OF THIS DOCUMENT (INCLUDING THE SYSTEM COST ESTIMATES) THAT THE IRONDALE CONTROL SYSTEM WILL BE USED FOR TREATING ANY CONTAMINATED GROUNDWATER PRODUCED FROM THE RAIL CLASSIFICATION YARD IRA. IF FURTHER INVESTIGATIONS SHOW THE ICS TREATMENT PLANT TO BE INCAPABLE OF HANDLING THE GROUNDWATER FROM THE RAILYARD IRA, THE SELECTION OF THE PREFERRED GROUNDWATER INTERCEPTION/CONTAINMENT SYSTEM MAY NEED TO BE RECONSIDERED.

COST ESTIMATES DEVELOPED FOR THE FIVE SYSTEM ALTERNATIVES EVALUATED IN THIS SECTION ARE INTENDED TO BE USEFUL FOR COMPARATIVE PURPOSES. FOR THE PURPOSE OF COST COMPARISONS, A 5-YEAR OPERATING LIFE HAS BEEN ASSUMED FOR THE IRA.

ENCIRCLING DBCP SOURCES WITH A PHYSICAL BARRIER

A CONCEPTUALLY SIMPLE CONTAINMENT SYSTEM CONSIDERED FOR THE RAIL CLASSIFICATION YARD IRA CONSISTS OF CONSTRUCTING A PHYSICAL BARRIER

COMPLETELY AROUND THE DBCP SOURCE AREAS AS DEPICTED IN FIGURE 4-1. GROUNDWATER WITHIN THE ENCLOSURE WOULD BE PUMPED TO KEEP WATER LEVELS FROM RISING DUE TO AQUIFER RECHARGE OR STABILIZATION AFTER HYDRAULIC SEPARATION FROM THE SURROUNDING AQUIFER.

AN ADVANTAGE OF COMPLETELY ENCIRCLING THE RAILYARD AREA WITH A PHYSICAL BARRIER IS THAT THE AMOUNT OF GROUNDWATER THAT MUST BE PUMPED AND TREATED DUE TO LEAKAGE OR RECHARGE WOULD BE REDUCED. ALTHOUGH DIFFICULT TO QUANTIFY, A PUMPING RATE OF 50 GPM FROM WITHIN THE ENCLOSURE SHOULD BE MORE THAN ADEQUATE, AND MUCH LESS THAN THE PUMPING RATES REQUIRED TO EFFECTIVELY OPERATE THE GROUNDWATER INTERCEPTION SYSTEMS DISCUSSED SUBSEQUENTLY IN THIS DOCUMENT. MINIMIZING THE AMOUNT OF PUMPED AND TREATED WATER MINIMIZES THE ASSOCIATED COSTS. ADDITIONALLY, THERE WOULD PROBABLY BE NO NEED TO PUMP THE TREATED WATER BACK TO THE RAILYARD AREA, BUT IT COULD BE RECHARGED TO THE AQUIFER IN EXISTING OR EXPANDED ICS RECHARGE FACILITIES.

A POTENTIALLY SIGNIFICANT ADVANTAGE OF ENCIRCLING THE RAILYARD WITH A PHYSICAL BARRIER IS THE POTENTIAL FOR CONTRIBUTING TO THE FINAL RESPONSE ACTION FOR THE SITE. ALTHOUGH THE FINAL ACTION HAS NOT BEEN DETERMINED, SOME OF THE POTENTIAL REMEDIATION SCHEMES WOULD BENEFIT FROM THE INSTALLATION OF A PHYSICAL BARRIER SURROUNDING THE SITE. FOR EXAMPLE, FLUSHING/LEACHING OR IN-SITU TREATMENT OF THE SOURCES OF DBCP MAY REQUIRE THAT THE SITE BE ISOLATED FROM THE ADJACENT AQUIFER WITH A PHYSICAL BARRIER.

AS SHOWN IN TABLE 4-1, THE CONSTRUCTION COSTS FOR A PHYSICAL BARRIER TO THE DEPTHS OF UP TO APPROXIMATELY 110 FEET REQUIRED FOR THIS SITE ARE SUBSTANTIAL. FOR THE REASONS DISCUSSED IN SECTION 4.2.3, EITHER A SOIL-BENTONITE SLURRY WALL OR DEEP SOIL MIXING WOULD APPEAR TO BE THE MOST COST-EFFECTIVE PHYSICAL BARRIER FOR THIS INSTALLATION. FOR THE PURPOSES OF THE COST ESTIMATE SHOWN IN TABLE 4-1, IT IS ASSUMED THAT A SOIL-BENTONITE SLURRY WALL WOULD PROVE TO BE THE MOST COST-EFFECTIVE PHYSICAL BARRIER, AND THAT THE TREATED WATER COULD BE RECHARGED IN EXISTING ICS FACILITIES. UNLIKE THE OTHER INTERCEPTION/CONTAINMENT SYSTEMS DISCUSSED IN THIS DOCUMENT, CONSTRUCTING A SOIL-BENTONITE SLURRY WALL WOULD ALSO REQUIRE SIGNIFICANT, ALTHOUGH TEMPORARY, DISTURBANCE OF SURFACE FACILITIES (E.G., RAILYARD TRACKS, LOCAL ROADS AND UTILITIES, LOADING DOCKS, ETC.) IN THE VICINITY OF THE CONSTRUCTION.

ANOTHER EFFECT OF ENCLOSING THE RAILYARD AREA WITH A PHYSICAL BARRIER IS THAT THE CURRENTLY SLOPING WATER TABLE WILL TEND TO BECOME LEVEL, RESULTING IN A RISING WATER TABLE IN THE NORTHERN END OF THE ENCLOSURE. IF THIS EFFECT IS UNACCEPTABLE BECAUSE OF THE RESULTING POTENTIAL FOR LEAKAGE OF CONTAMINATED WATER FROM THE ENCLOSURE, THE PUMPING RATE MUST BE CAPABLE OF REDUCING OR ELIMINATING THE WATER TABLE RISE. SIMULTANEOUSLY, THE RESULTANT DECLINE IN THE WATER LEVELS IN THE SOUTHERN PORTION OF THE ENCLOSURE WOULD RESULT IN A HYDRAULIC GRADIENT FROM THE SURROUNDING AQUIFER INTO THE ENCLOSURE. IF THE PHYSICAL BARRIER HAS NO MAJOR IMPERFECTIONS, THE AMOUNT OF THIS LEAKAGE WOULD PROBABLY BE ONLY A FEW GALLONS PER MINUTE OR LESS. HOWEVER, IF LARGE, PERMEABLE IMPERFECTIONS EXIST IN THE BARRIER OR ITS DENVER FORMATION KEY, THE RESULTING LEAKAGE COULD SIGNIFICANTLY INCREASE THE REQUIRED PUMPING AND TREATING RATE. IN SPITE OF THESE POTENTIAL EFFECTS, A PUMPING RATE OF 50 GPM IS EXPECTED TO BE ADEQUATE FOR THIS SYSTEM.

INTERCEPTION SYSTEM PERPENDICULAR TO CONTAMINANT FLOWPATH WITHOUT A PHYSICAL BARRIER

A GROUNDWATER INTERCEPTION SYSTEM CONCEPTUALLY SIMILAR TO THE ICS COULD BE CONSTRUCTED SLIGHTLY NORTH OF THE DBCP SOURCES FOUND IN THE RAILYARD AREA. A TYPICAL CONFIGURATION FOR SUCH A SYSTEM (ILLUSTRATED IN FIGURE 4-2) IS A ROW(S) OF EXTRACTION WELLS EXTENDING ACROSS THE DBCP

GROUNDWATER PLUME, A GROUNDWATER TREATMENT SYSTEM, AND A LINE OF RECHARGE WELLS NORTH OF THE EXTRACTION SYSTEM. WHEN OPERATED PROPERLY, THE SYSTEM COULD MAINTAIN HIGHER WATER LEVELS ALONG THE RECHARGE WELLS THAN ALONG THE EXTRACTION SYSTEM, THUS PROVIDING A HYDRAULIC BARRIER TO THE CONTAMINATED GROUNDWATER. AS DEMONSTRATED BY THE ICS, SUCH SYSTEMS CAN PROVIDE EFFECTIVE GROUNDWATER INTERCEPTION. BECAUSE OF THE NECESSITY FOR THE RECHARGE WATER TO ENTER THE AQUIFER AT THE PROPER LOCATIONS, IT WOULD BE NECESSARY TO INJECT THE RECHARGE WATER DIRECTLY INTO THE AQUIFER. CONSEQUENTLY, RECHARGE WELLS WOULD BE RECOMMENDED FOR THIS RECHARGE SYSTEM. THE USE OF SHALLOW RECHARGE TRENCHES, PITS, OR LEACH FIELDS WOULD NOT BE ADEQUATE.

BASED ON PRELIMINARY NUMERICAL SIMULATIONS OF THE INTERCEPTION SYSTEM SHOWN IN FIGURE 4-2, PUMPING, TREATMENT, AND RECHARGE RATES OF APPROXIMATELY 300 GPM APPEAR TO BE REQUIRED TO PROVIDE AN ADEQUATE MARGIN OF SAFETY AGAINST CONTAMINANT BYPASS. THIS RELATIVELY HIGH FLOWRATE, CAUSED BY THE LARGE AMOUNT OF RECYCLING BETWEEN THE RECHARGE AND EXTRACTION SYSTEMS, IS ONE OF THE MORE SIGNIFICANT DISADVANTAGES OF THIS TYPE OF SYSTEM CONFIGURATION. THE ESTIMATED COSTS OF THIS INTERCEPTION SYSTEM ARE SHOWN IN TABLE 4-2.

INTERCEPTION SYSTEM PERPENDICULAR TO CONTAMINANT FLOWPATH WITH A PHYSICAL BARRIER

DUE TO THE COSTS OF THE LARGE AMOUNT OF RECYCLING IN THE SYSTEM, INCLUSION OF A PHYSICAL BARRIER BETWEEN THE RECHARGE AND EXTRACTION SYSTEMS IS SOMETIMES COST EFFECTIVE. SUCH A SYSTEM, ILLUSTRATED IN FIGURE 4-3, IS INCORPORATED IN THE NORTHERN PORTION OF THE EXISTING NORTHWEST BOUNDARY SYSTEM ON THE ARSENAL. BECAUSE OF THE HORIZONTAL EXTENT OF THE ALLUVIAL AQUIFER UNDERLYING THE RAILYARD AREA, THERE WOULD BE SOME RECYCLING OF WATER AROUND THE ENDS OF A PHYSICAL BARRIER IF A PROPER REVERSE HYDRAULIC GRADIENT IS MAINTAINED. NEVERTHELESS, SIMULATIONS HAVE SHOWN THAT A PHYSICAL BARRIER WOULD ALLOW REDUCTION OF THE SYSTEM FLOWRATE TO ROUGHLY 200 GPM, WHILE MAINTAINING AN ADEQUATE REVERSE HYDRAULIC GRADIENT. AS WITH THE SYSTEM DESCRIBED IN SECTION 4.3.2, THIS REVERSE HYDRAULIC GRADIENT, NOT THE PHYSICAL BARRIER, WOULD PROVIDE THE BARRIER TO THE MIGRATION OF CONTAMINATED WATER. THE PHYSICAL BARRIER WOULD PRIMARILY BE INTENDED TO RESTRICT THE FLOW OF CLEAN WATER FROM THE RECHARGE SYSTEM TO THE EXTRACTION SYSTEM.

WHETHER A PHYSICAL BARRIER IS INCLUDED IN THE GROUNDWATER INTERCEPTION SYSTEM DESCRIBED ABOVE IS LARGELY AN ECONOMIC DECISION. IF THE BARRIER COSTS ARE OFFSET BY THE REDUCED COSTS OF EXTRACTING, TREATING, AND RECHARGING THE SMALLER FLOWS, THEN INSTALLING A PHYSICAL BARRIER WOULD BE COST-EFFECTIVE. POSSIBLE ADDITIONAL CONSIDERATIONS COULD INCLUDE WHETHER THE PRESENCE OF A PHYSICAL BARRIER WOULD BE EXPECTED TO BE UNDESIRABLE DURING OR FOLLOWING FINAL REMEDIATION, OR WHETHER THE PRESENCE OF A PHYSICAL BARRIER WOULD ADD SOME MARGIN OF SAFETY TO THE OPERATION OF THE GROUNDWATER INTERCEPTION SYSTEM. BOTH OF THESE CONSIDERATIONS ARE BELIEVED TO BE MINOR FOR THIS IRA.

FOR THIS SYSTEM ALTERNATIVE, A SOIL-BENTONITE SLURRY WALL APPEARS TO BE THE MOST COST-EFFECTIVE TYPE OF PHYSICAL BARRIER, AND ITS USE HAS BEEN ASSUMED IN PREPARING THE COST ESTIMATES FOR THIS IRA AS PRESENTED IN TABLE 4-3. A COMPARISON OF ESTIMATED PROJECT COSTS CONTAINED IN TABLES 4-2 AND 4-3 DO NOT SHOW A LARGE DIFFERENCE BETWEEN THE COSTS OF THE TWO SYSTEMS. FURTHER REFINEMENT OF THE DESIGNS AND COSTS OF THESE TWO SYSTEMS WOULD BE NEEDED BEFORE THE MOST COST-EFFECTIVE SYSTEM COULD BE CHOSEN.

INTERCEPTION SYSTEM PARALLEL TO CONTAMINANT FLOWPATH WITHOUT A PHYSICAL BARRIER

A VARIATION OF THE GROUNDWATER INTERCEPTION SYSTEM DESCRIBED IN SECTION

4.3.2 WOULD BE TO ALIGN THE SYSTEM PARALLEL TO THE DIRECTION OF GROUNDWATER FLOW AS ILLUSTRATED IN FIGURE 4-4. AN EFFECTIVE GROUNDWATER INTERCEPTION SYSTEM WOULD BE ACHIEVED WHEN ALL OF THE CONTAMINATED PLUME CONVERGES ON THE EXTRACTION WELLS. PRELIMINARY SIMULATIONS HAVE SHOWN THAT THE PUMPING RATE OF SUCH AN INTERCEPT SYSTEM IN THE RAILYARD AREA COULD BE REDUCED TO ABOUT 150 GPM. THE SMALLER REQUIRED FLOWRATE WOULD BE DUE TO THE FACT THAT RECIRCULATION OF TREATED WATER WOULD OCCUR PRINCIPALLY AT THE NORTHERNMOST EXTRACTION WELL, WHEREAS EXTENSIVE RECIRCULATION IN THE SYSTEM OUTLINED IN SECTION 4.3.2 WOULD OCCUR IN ALL OF THE EXTRACTION WELLS.

THE REDUCED PUMPING RATE IS THE PRIMARY ADVANTAGE OF THIS MODIFICATION. THE ESTIMATED COSTS OF THIS INTERCEPTION SYSTEM ARE TABULATED IN TABLE 4-4. A COMPARISON OF THE COSTS IN TABLES 4-2 AND 4-4 INDICATES THAT, FOR THIS IRA, AN INTERCEPTION SYSTEM ALIGNED ALONG THE AXIS OF THE CONTAMINATED PLUME WOULD PROBABLY BE MORE COST-EFFECTIVE THAN ONE ALIGNED PERPENDICULAR TO THE FLOWPATHS.

INTERCEPTION SYSTEM PARALLEL TO CONTAMINANT FLOWPATH WITH A PHYSICAL BARRIER AND RECHARGE NEAR THE ICS

A PHYSICAL BARRIER COULD BE ADDED TO THE INTERCEPTION SYSTEM DESCRIBED IN SECTION 4.3.4, (FIGURE 4-5). INCLUDING A PHYSICAL BARRIER WOULD ADD SOME MARGIN OF SAFETY TO THE SYSTEM. DURING PERIODS WHEN THE SYSTEM MAY BE OUT OF OPERATION, THE WATER TABLE WITHIN THE V-SHAPED PHYSICAL BARRIER MUST RISE SIGNIFICANTLY BEFORE ANY CONTAMINATED WATER COULD GET AROUND THE BARRIER.

UNLIKE THE INTERCEPTION SYSTEMS CONSIDERED IN SECTIONS 4.3.2, 4.3.3, AND 4.3.4, PRELIMINARY NUMERICAL SIMULATIONS HAVE SHOWN THAT, WITH THE ADDITION OF THE PHYSICAL BARRIER TO THE SYSTEM DESCRIBED IN SECTION 4.3.4, A REVERSE HYDRAULIC GRADIENT COULD BE MAINTAINED WITHOUT RECHARGING TREATED WATER NEARBY. INSTEAD, THE TREATED WATER COULD BE RECHARGED IN EITHER EXISTING OR EXPANDED FACILITIES OF THE ICS, THUS SAVING THE COSTS OF PUMPING AND PIPELINE CONSTRUCTION.

A DRAWBACK OF INCLUDING THE PHYSICAL BARRIER IS ITS COST. ESTIMATED COSTS OF THE COMPLETE INTERCEPTION SYSTEM ILLUSTRATED IN FIGURE 4-5 ARE SHOWN IN TABLE 4-5. A COMPARISON OF TABLES 4-4 AND 4-5 INDICATES THAT THE ADDED COSTS OF A SLURRY WALL WOULD PROBABLY NOT BE COMPLETELY OFFSET BY THE COST SAVINGS RESULTING FROM RECHARGING THE TREATED WATER NEAR THE ICS.

#CHRON
CHRONOLOGY OF EVENTS

THE SIGNIFICANT EVENTS LEADING TO THE DECISION TO SELECT GROUNDWATER INTERCEPTION/CONTAINMENT AS THE PREFERRED ALTERNATIVE IN THE RAIL CLASSIFICATION YARD IRA ARE PRESENTED BELOW.

DATE	EVENT
1980	IN EARLY 1980, DBCP WAS DETECTED IN GROUNDWATER IN THE ALLUVIAL AQUIFER BENEATH THE IRONDALE COMMUNITY, LOCATED TO THE NORTHWEST OF RMA.
DECEMBER 1981	THE IRONDALE DBCP CONTROL SYSTEM (ICS) WAS PLACED INTO OPERATION TO PREVENT DBCP-CONTAMINATED GROUNDWATER FROM MIGRATING OFFPOST. THE ICS PUMPS GROUNDWATER FROM THE ALLUVIAL AQUIFER, TREATS THE GROUNDWATER TO REMOVE CONTAMINANTS, AND INJECTS THE TREATED WATER BACK INTO THE ALLUVIAL AQUIFER.

SEPTEMBER 1982	THE US ARMY COMPLETED ASSESSMENT OF CONTAMINANT MIGRATION FROM POTENTIAL CONTAMINATION SOURCES (GERAGHTY & MILLER 1982). DBCP DETECTED IN RAILYARD SOIL BORINGS INDICATED THIS AREA IS A POTENTIAL SOURCE OF THE DBCP PLUME.
SEPTEMBER 1984	THE US ARMY COMPLETED DIBROMO-CHLOROPROPANE SOURCE DEFINITION, ROCKS MOUNTAIN ARSENAL, COLORADO (WHITTEN AND SHAMBURGER 1984). INSTALLATION AND SAMPLING OF ADDITIONAL MONITORING WELLS INDICATED THAT A CONTINUOUS DBCP PLUME PROBABLY EMANATES FROM THE RAILYARD IN SECTION 3 AND FLOWS NORTHWEST THROUGH SECTIONS 4 AND 33 TO THE ICS.
JUNE 1987	THE STATE OF COLORADO, SHELL OIL COMPANY, US EPA, AND US ARMY AGREED THAT 13 INTERIM RESPONSE ACTIONS (INCLUDING THE RAIL CLASSIFICATION YARD) WOULD BE CONDUCTED.
FEBRUARY 1, 1988	PROPOSED CONSENT DECREE LODGED IN THE CASE OF US V. SHELL OIL COMPANY WITH THE US DISTRICT COURT IN DENVER, COLORADO. THE CONSENT DECREE SPECIFIED 13 INTERIM RESPONSE ACTIONS (INCLUDING THE RAIL CLASSIFICATION YARD) TO FACILITATE REMEDIATION ACTIVITIES.
MARCH 1988	THE US ARMY COMPLETED FINAL CONTAMINATION ASSESSMENT REPORT, SITE 3-4, NEMAGON SPILL AREA, VERSION 3.2 (EBASCO 1988A). LOCATING DBCP SOURCES PROVED TO BE VERY DIFFICULT; DBCP WAS DETECTED AT ONLY ONE SOIL SAMPLING LOCATION WITHIN THE HOLDING TRACKS IN THE RAILYARD.
OCTOBER 1988	THE US ARMY COMPLETED FINAL PHASE II DATA ADDENDUM, SITE 3-4, NEMAGON SPILL AREA, VERSION 3.1 (EBASCO 1988B). ADDITIONAL SOIL SAMPLING CONFIRMED THE PRESENCE OF DBCP IN SHALLOW SOIL NEAR THE SAMPLING LOCATION MENTIONED ABOVE.
FEBRUARY 1989	THE FEDERAL FACILITY AGREEMENT (1989) SPECIFIED THAT THE RAIL CLASSIFICATION YARD IS ONE OF SEVERAL SITES WHERE INTERIM RESPONSE ACTIONS ARE PROPOSED.
AUGUST 18, 1989	SHELL OIL COMPANY SUBMITTED DRAFT FINAL ALTERNATIVES ASSESSMENT FOR OTHER CONTAMINATION SOURCES, INTERIM RESPONSE ACTION. RAIL CLASSIFICATION YARD, RMA (SHELL 1989A) TO THE US ARMY TO BE ISSUED TO THE ORGANIZATIONS AND THE STATE. RESULTS OF FIELD INVESTIGATIONS AND PROPOSED ALTERNATIVE TECHNOLOGIES FOR THE IMPLEMENTATION OF THE IRA WERE PRESENTED. GROUNDWATER INTERCEPTION/CONTAINMENT WAS RECOMMENDED AS THE PREFERRED STRATEGY.
SEPTEMBER 20, 1989	RECEIVED COMMENTS FROM THE US EPA CONCERNING DRAFT FINAL ALTERNATIVES ASSESSMENT FOR OTHER CONTAMINATION SOURCES. INTERIM RESPONSE ACTION, RAIL CLASSIFICATION YARD, RMA.
OCTOBER 25, 1989	SHELL OIL COMPANY SUBMITTED FINAL ALTERNATIVES ASSESSMENT FOR OTHER CONTAMINATION SOURCES, INTERIM RESPONSE ACTION, RAIL CLASSIFICATION YARD, RMA (SHELL 1989B) TO THE US ARMY TO BE ISSUED TO THE ORGANIZATIONS AND THE STATE.

IRA PROCESS

WITH RESPECT TO THIS IRA FOR THE RAIL CLASSIFICATION YARD, THE IRA PROCESS IS AS FOLLOWS:

1. AS LEAD PARTY, SHELL PREPARED A DRAFT FINAL ALTERNATIVES ASSESSMENT FOR OTHER CONTAMINATION SOURCES, INTERIM RESPONSE ACTION, RAIL CLASSIFICATION YARD, RMA INCLUDING A DRAFT OF THE ARARS (PREPARED BY THE US ARMY). THIS WAS SUBMITTED TO THE US ARMY FOR ISSUANCE TO THE DEPARTMENT OF INTERIOR (DOI) AND THE OTHER ORGANIZATIONS FOR REVIEW AND COMMENT. COMMENTS WERE SUBMITTED SOLELY BY THE US EPA WITHIN 30 DAYS AFTER RECEIPT OF THE DRAFT ASSESSMENT. AFTER THE CLOSE OF THE COMMENT PERIOD, AND IN CONSIDERATION OF THE COMMENTS RECEIVED, SHELL PREPARED AND TRANSMITTED THE FINAL ASSESSMENT TO THE US ARMY, FOR ISSUANCE TO THE DOI AND THE OTHER ORGANIZATIONS.

2. SHELL, THE DOI, AND THE OTHER ORGANIZATIONS WERE AFFORDED THE OPPORTUNITY TO PARTICIPATE, AT THE RMA COMMITTEE LEVEL, IN THE IDENTIFICATION AND SELECTION OF ARARS PERTINENT TO THIS IRA.

3. AS LEAD PARTY, SHELL SUBMITTED THIS PROPOSED DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD IRA TO THE US ARMY FOR ISSUANCE TO THE DOI AND THE OTHER ORGANIZATIONS. IT INCLUDED THE ARMY'S FINAL ARAR DECISION. THE PROPOSED DECISION DOCUMENT WAS SUBJECT TO A 30-DAY PUBLIC COMMENT PERIOD DURING WHICH THE OTHER ORGANIZATIONS, THE DOI, AND ANY OTHER PERSON COULD COMMENT ON THE PROPOSED IRA DECISION DOCUMENT. THE ARMY HELD A PUBLIC MEETING DURING THE COMMENT PERIOD TO INFORM THE COMMUNITY IN THE VICINITY OF THE ARSENAL OF THIS IRA. THE PROPOSED DECISION DOCUMENT WILL BE SUPPORTED BY AN ADMINISTRATIVE RECORD.

4. PROMPTLY AFTER CLOSE OF THE COMMENT PERIOD, SHELL SUBMITTED THE DRAFT FINAL DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD IRA TO THE US ARMY FOR TRANSMITTAL TO THE DOI AND THE OTHER ORGANIZATIONS.

5. WITHIN 20 DAYS AFTER ISSUANCE OF THE DRAFT FINAL DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD IRA, AN ORGANIZATION (INCLUDING THE STATE IF IT HAS AGREED TO BE BOUND BY THE DISPUTE RESOLUTION PROCESS, AS REQUIRED BY THE CONSENT DECREE, OR DOI UNDER THE CIRCUMSTANCES SET FORTH IN THE CONSENT DECREE) MAY INVOKE DISPUTE RESOLUTION. DISPUTE RESOLUTION MAY CONCERN EITHER THE PROPOSED IRA OR THE ARMY'S ARAR DECISION.

6. AFTER THE CLOSE OF THE PERIOD FOR INVOKING DISPUTE RESOLUTION (IF DISPUTE RESOLUTION IS NOT INVOKED) OR AFTER THE COMPLETION OF DISPUTE RESOLUTION (IF INVOKED), SHELL SHALL SUBMIT A FINAL DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD IRA TO THE ARMY. THE SUPPORTING ADMINISTRATIVE RECORD WILL BE INCLUDED. THE ARMY SHALL THEN ISSUE A FINAL DECISION DOCUMENT TO THE OTHER ORGANIZATIONS AND THE DOI. THEREAFTER, THE DECISION DOCUMENT WILL BE SUBJECT TO JUDICIAL REVIEW IN ACCORDANCE WITH SECTIONS 113 AND 121 OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980, AS AMENDED, 42 USC SECTIONS 9613, 9621.

7. FOLLOWING ISSUANCE OF THE FINAL IRA DECISION DOCUMENT, SHELL SHALL BE THE LEAD PARTY RESPONSIBLE FOR DESIGNING AND IMPLEMENTING THE IRA IN CONFORMANCE WITH THE DECISION DOCUMENT. SHELL SHALL ISSUE A DRAFT IRA IMPLEMENTATION DOCUMENT TO THE DOI AND THE OTHER ORGANIZATIONS FOR REVIEW AND COMMENT. THIS DRAFT IMPLEMENTATION DOCUMENT SHALL INCLUDE FINAL DRAWINGS AND SPECIFICATIONS, FINAL DESIGN ANALYSES, A COST ESTIMATE, AND A SCHEDULE FOR IMPLEMENTATION OF THE IRA.

8. AS LEAD PARTY FOR DESIGN AND IMPLEMENTATION OF THIS IRA, SHELL WILL ISSUE THE FINAL IMPLEMENTATION DOCUMENT, AS DESCRIBED ABOVE, AND WILL BE RESPONSIBLE FOR IMPLEMENTING THE IRA IN ACCORDANCE WITH THE IRA

IMPLEMENTATION DOCUMENT.

DESCRIPTION OF THE RAIL CLASSIFICATION YARD INTERIM RESPONSE ACTION

THE SELECTED STRATEGY FOR THE RAIL CLASSIFICATION YARD IRA IS GROUNDWATER INTERCEPTION/CONTAINMENT. EACH OF THE FIVE GROUNDWATER INTERCEPTION/CONTAINMENT SYSTEM ALTERNATIVES DESCRIBED IN SECTION 4.3 APPEARS TO BE A VIABLE OPTION THAT MEETS THE OBJECTIVES OF THE IRA AND COULD BE IMPLEMENTED ON A TIMELY BASIS. ON A COST BASIS, EACH APPEARS TO BE REASONABLE AND EFFECTIVE (SEE TABLES 4-1 THROUGH 4-5). THE DIFFERENCES BETWEEN THE ESTIMATED COSTS FOR THE FOUR GROUNDWATER INTERCEPTION SYSTEMS MAY BE WITHIN ESTIMATING ERROR (E.G., ASSUMPTIONS ON ACCEPTABILITY OF USING THE ICS TREATMENT PLANT AND THE HYDRAULIC CONDUCTIVITY ESTIMATE OF 5.0 X (10-2) CM/SEC).

BASED ON ITS SUITABILITY AND THE COST ESTIMATES PRESENTED, AN INTERCEPTION SYSTEM INSTALLED PARALLEL TO THE CONTAMINANT FLOWPATH WITHOUT A PHYSICAL BARRIER IS SELECTED FOR IMPLEMENTATION (FIGURE 4-4 AND TABLE 4-4). THE SELECTED ALTERNATIVE WILL CONSIST OF A ROW OF ALLUVIAL EXTRACTION WELLS LOCATED ALONG THE CENTER AXIS OF THE DBCP PLUME, ONE OR MORE ROWS OF RECHARGE WELLS LOCATED NEAR THE DOWNSTREAM END OF THE INTERCEPTION SYSTEM, MODIFICATIONS TO THE ICS TO PROVIDE SUFFICIENT TREATMENT CAPACITY FOR THE PUMPED WATER FROM THE RAILYARD IRA, AND PIPELINES FOR CONVEYING THE WATER TO AND FROM THE ICS. A SYSTEM OF ALLUVIAL MONITORING WELLS WILL ALSO BE INSTALLED IN THE VICINITY OF THE INTERCEPTION SYSTEM.

PARTLY IN RESPONSE TO A COMMENT RECEIVED FROM THE EPA THAT CONSIDERATION BE GIVEN TO ADDRESSING OTHER CONTAMINANTS IN THIS IRA, THE FINAL ALTERNATIVE ASSESSMENT FOR THE MOTOR POOL AREA IRA (WOODWARD-CLYDE 1989) PROPOSES THAT A MOTOR POOL GROUNDWATER INTERCEPTION SYSTEM BE IMPLEMENTED JOINTLY WITH THE RAILYARD IRA INTERCEPTION SYSTEM. THIS DECISION IS DESIRABLE BECAUSE OF THE PROXIMITY OF THESE SITES, THE SUITABILITY OF CARBON ADSORPTION FOR TREATING BOTH DBCP AND TCE, AND THE POTENTIAL HYDRAULIC INTERFERENCES BETWEEN THE SEPARATE INTERCEPTION SYSTEMS. THE DRAFT FINAL DECISION DOCUMENT FOR THE MOTOR POOL AREA INCLUDES A GROUNDWATER CONTAINMENT/TREATMENT COMPONENT, WHICH MAY BE IMPLEMENTED IN CONJUNCTION WITH THE RAILYARD IRA, DEPENDING UPON THE RESULTS OF FURTHER STUDIES.

THE MAJOR ASSUMPTIONS UPON WHICH THE SELECTION OF THIS INTERCEPTION SYSTEM IS BASED WILL BE CHECKED DURING THE PREPARATION OF THE IMPLEMENTATION DOCUMENT FOR THIS IRA. IF DIFFERENCES BETWEEN THE ASSUMED AND ACTUAL CONDITIONS ARE SIGNIFICANT, OR IF DEEMED APPROPRIATE AFTER ASSESSING THE EFFECTS OF JOINTLY IMPLEMENTING THE MOTOR POOL AND RAILYARD IRA INTERCEPTION SYSTEMS, RECONSIDERATION OF THE SELECTED SYSTEM COULD OCCUR.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE REMEDIATION OF OTHER CONTAMINATION SOURCES (RAIL CLASSIFICATION YARD) INTERIM RESPONSE ACTION

INTRODUCTION

THESE DRAFT APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) ADDRESS A SPECIFIC AREA, THE RAIL CLASSIFICATION YARD, IDENTIFIED FOR REMEDIATION PRIOR TO THE ISSUANCE OF A RECORD OF DECISION (ROD) FOR THE ONPOST OPERABLE UNIT OF THE ROCKY MOUNTAIN ARSENAL. THIS INTERIM RESPONSE ACTION IS INTENDED TO PROVIDE REMEDIATION ON AN INTERIM BASIS FOR THIS DESIGNATED AREA AND IS NOT INTENDED TO BE A FINAL RESPONSE ACTION. FURTHER RESPONSE ACTIONS, AS NECESSARY, WILL BE DETERMINED IN THE ONPOST ROD.

AMBIENT OR CHEMICAL-SPECIFIC ARARS

AMBIENT OR CHEMICAL-SPECIFIC REQUIREMENTS SET CONCENTRATION LIMITS OR RANGES IN VARIOUS ENVIRONMENTAL MEDIA FOR SPECIFIC HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS. SUCH ARARS EITHER SET PROTECTIVE CLEANUP LEVELS FOR THE CHEMICALS OF CONCERN IN THE DESIGNATED MEDIA OR INDICATE AN APPROPRIATE LEVEL OF DISCHARGE BASED ON TECHNOLOGICAL CONSIDERATIONS.

THE OBJECTIVES OF THIS IRA ARE DISCUSSED ELSEWHERE IN THE DRAFT FINAL DECISION DOCUMENT. THIS IRA WILL BE IMPLEMENTED PRIOR TO THE FINAL REMEDIATION TO BE UNDERTAKEN IN THE CONTEXT OF THE ONPOST OPERABLE UNIT ROD. THE LIST OF SPECIFIC CONTAMINANTS HAS BEEN COMPLETED BASED UPON THE FIELD DATA CONCERNING THIS SPECIFIC SOURCE. THE MEDIA OF CONCERN HERE ARE THE WATER WHICH MAY BE REMOVED AND TREATED FROM THIS SOURCE AREA AND THE SOILS, WHICH MAY CONTAIN CONTAMINANTS. HOWEVER, NO AMBIENT OR CHEMICAL-SPECIFIC ARARS WERE IDENTIFIED CONCERNING LEVELS OF CONTAMINANTS FOR SOILS. THE CHEMICAL-SPECIFIC ARARS LISTED BELOW WILL APPLY AT THE POINT OF DISCHARGE OF TREATED WATER FROM THE SELECTED TREATMENT SYSTEM, THE IRONDALE BOUNDARY SYSTEM (IBS). THE WATER TREATMENT TO BE PROVIDED BY THE IBS IS LIMITED TO ACTIVATED CARBON ADSORPTION, WHICH TREATS ORGANIC CONTAMINANTS. ARARS WERE IDENTIFIED FOR THOSE ORGANIC CONTAMINANTS EXPECTED TO BE CONTAINED IN THE INFLUENT RECEIVED BY THE IBS, INCLUDING INFLUENT RECEIVED FROM THE MOTOR POOL AREA, AS DISCUSSED IN THE DECISION DOCUMENT FOR THAT SPECIFIC AREA.

BECAUSE THE IBS DOES NOT PROVIDE DRINKING WATER AND IS NOT A PUBLIC WATER SYSTEM, THE STANDARDS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT (SDWA) AND THE CLEAN WATER ACT (CWA) FOR DRINKING WATER ARE NOT APPLICABLE TO THIS IRA.

THE STANDARDS CONTAINED IN 40 CFR SECTION 264.94 WERE NOT CONSIDERED APPLICABLE TO THIS TREATMENT SYSTEM BECAUSE THE CONSTITUENTS IN THE INFLUENT ARE NOT FROM REGULATED UNITS. SINCE THE STANDARDS PROMULGATED PURSUANT TO THIS REGULATION ARE IDENTICAL TO THOSE PROMULGATED UNDER THE NATIONAL PRIMARY DRINKING WATER REGULATIONS (NPDW) PURSUANT TO THE SDWA, FURTHER DISCUSSED BELOW, FOR THE SAME 14 COMPOUNDS THESE STANDARDS ARE NOT CONSIDERED FURTHER.

CONSISTENT WITH THE MOST RECENT EPA GUIDANCE, THE PROPOSED NATIONAL CONTINGENCY PLAN, 53 FED. REG. 51441, MAXIMUM CONTAMINANT LEVEL GOALS CONTAINED IN THE NPDW ARE NOT CONSIDERED EITHER APPLICABLE OR RELEVANT AND APPROPRIATE TO APPLY IN THE CONTEXT OF THIS TREATMENT SYSTEM. EPA'S TOLERANCES FOR PESTICIDE CHEMICALS ON OR IN RAW AGRICULTURAL COMMODITIES (TPCRAC), 40 CFR PART 180 AND THE FOOD AND DRUG ADMINISTRATION'S TOLERANCES FOR PESTICIDES IN FOOD, ADMINISTERED BY EPA (TPF), ARE NOT RELEVANT AND APPROPRIATE TO APPLY IN THE CONTEXT OF THIS IRA. THESE STANDARDS WERE DEVELOPED FOR PARTICULAR ITEMS (E.G. FOOD AND CROPS) WHICH ARE NOT SUBJECT TO WATERING WITH THE EFFLUENT FROM THIS TREATMENT SYSTEM.

THE COLORADO BASIC STANDARDS FOR GROUNDWATER (CBSG), 3.11.0 (5 CCR 1002-8), ARE NOT APPLICABLE, CONSISTENT WITH CURRENT EPA GUIDANCE AS CONTAINED IN THE PROPOSED NCP, 53 FED. REG. 51394, 51475, BUT ARE CONSIDERED RELEVANT AND APPROPRIATE TO APPLY TO THE SELECTED COMPOUNDS AT THE POINT OF REINJECTION OF THE TREATED EFFLUENT FROM THE IBS. SOME OF THESE STANDARDS ARE MORE STRINGENT THAN THE NPDW MCLS, DISCUSSED BELOW, FOR THE CONTAMINANTS TO BE TREATED BY THIS IRA AND WERE THEREFORE SELECTED AS RELEVANT AND APPROPRIATE TO APPLY. WHERE THE CBSG STANDARD WAS IDENTICAL TO THE MCL, THE MCL IS IDENTIFIED AS THE ARAR.

FEDERAL WATER QUALITY CRITERIA (FWQC) WERE REVIEWED AND CONSIDERED NOT APPLICABLE TO THIS IRA SINCE THEY ARE NON-ENFORCEABLE GUIDELINES AND NOT ENFORCEABLE LIMITATIONS. AQUATIC LIFE IS NOT BELIEVED TO BE A CONCERN

REGARDING TREATED WATER. MCLS AND OTHER SELECTED STANDARDS, DISCUSSED BELOW, ARE CONSIDERED TO BE SUFFICIENTLY PROTECTIVE OF HUMAN HEALTH. UNDER THESE CIRCUMSTANCES, FWQC WERE NOT CONSIDERED RELEVANT AND APPROPRIATE TO APPLY IN THE CONTEXT OF THIS IRA.

IN ORDER TO PROVIDE ADEQUATE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT, THE ARMY HAS DETERMINED THAT MAXIMUM CONTAMINANT LEVELS (MCLS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT ARE RELEVANT AND APPROPRIATE TO APPLY WITHIN THE CONTEXT OF THIS IRA. THE ARMY BELIEVES THAT THESE LIMITATIONS WILL RESULT IN AN EFFLUENT WHICH DOES NOT REPRESENT A POTENTIAL RISK TO HUMAN HEALTH AND THE ENVIRONMENT.

SOME COMPOUNDS, AT PRESENT, ONLY HAVE MCLS PROPOSED. THESE, WHILE NOT ARARS, ARE CONSIDERED IN THE DESIGN OF THE SYSTEM. THESE COMPOUNDS ARE LISTED SEPARATELY AS "TO BE CONSIDERED" (TBC) STANDARDS, CONSISTENT WITH THE PROPOSED NCP, 53 FED. REG. 53394, 51436.

THE CHEMICAL-SPECIFIC ARARS DETERMINED RELEVANT AND APPROPRIATE TO APPLY IN THE CONTEXT OF THIS IRA ARE:

COMPOUND	ARAR LEVEL	SOURCE
BENZENE	5 UG/L	40 CFR S 141.61(A)
1,1-DICHLOROETHYLENE	7 UG/L	CBSG
1,2-DICHLOROETHYLENE	70 UG/L	CBSG
T-1,2-DICHLOROETHYLENE	7 UG/L	40 CFR S 141.61(A)
TOLUENE	2,420 UG/L	CBSG
1,1,1-TRICHLOROETHANE	200 UG/L	40 CFR S 141.61(A)
1,1,2-TRICHLOROETHANE	28 UG/L	CBSG
TRICHLOROETHYLENE	5 UG/L	40 CFR S 141.61(A)

THE FOLLOWING STANDARDS ARE TBCS AND WILL BE CONSIDERED IN THE DESIGN OF THIS TREATMENT SYSTEM AND SOUGHT TO BE ATTAINED, IF PRACTICABLE:

COMPOUND	TBC LEVEL	SOURCE
DBCP	0.2 UG/L	54 FR 22093
1,1-DICHLOROETHYLENE	0.06 UG/L	EPA HEALTH ASSESSMENT SUM.
TOLUENE	2,000 UG/L	54 FR 22093
1,1,2-TRICHLOROETHANE	0.6 UG/L	EPA HEALTH ASSESSMENT SUM.

LOCATION-SPECIFIC ARARS

LOCATION-SPECIFIC REQUIREMENTS SET RESTRICTIONS ON ACTIVITIES, DEPENDING ON THE CHARACTERISTICS OF THE SITE OR THE IMMEDIATE ENVIRONMENT, AND FUNCTION LIKE ACTION-SPECIFIC REQUIREMENTS. ALTERNATIVE REMEDIAL ACTIONS MAY BE RESTRICTED OR PRECLUDED, DEPENDING ON THE LOCATION OR CHARACTERISTICS OF THE SITE AND THE REQUIREMENTS THAT APPLY TO IT.

IT SHOULD BE NOTED THAT PARAGRAPH 44.2 OF THE FEDERAL FACILITY AGREEMENT PROVIDES THAT "WILDLIFE HABITAT(S) SHALL BE PRESERVED AND MANAGED AS NECESSARY TO PROTECT ENDANGERED SPECIES OF WILDLIFE TO THE EXTENT REQUIRED BY THE ENDANGERED SPECIES ACT (16 USC, 1531 ET SEQ.), MIGRATORY BIRDS TO THE EXTENT REQUIRED BY THE MIGRATORY BIRD TREATY ACT (16 USC, 703 ET SEQ.), AND BALD EAGLES TO THE EXTENT REQUIRED BY THE BALD EAGLE PROTECTION ACT, 16 USC, 688 ET SEA."

WHILE THIS PROVISION IS NOT AN ARAR, THE STATUTORY REQUIREMENTS ARE ARARS AND WILL BE COMPLIED WITH FOR PURPOSES OF THIS IRA. BASED ON THE LOCATION OF THE IBS AND THE NEW PIPING AND OTHER CONSTRUCTION THAT IS CONTEMPLATED BY THIS IRA, THE ARMY BELIEVES THAT THIS IRA WILL HAVE NO

ADVERSE IMPACT ON ANY ENDANGERED SPECIES OR MIGRATORY BIRDS OR ON THE PROTECTION OF WILDLIFE HABITATS. COORDINATION WILL BE MAINTAINED WITH THE US FISH AND WILDLIFE SERVICE TO ENSURE THAT NO SUCH ADVERSE IMPACT ARISES FROM IMPLEMENTATION OF THIS IRA.

THE ARMY HAS IDENTIFIED AS RELEVANT AND APPROPRIATE AND WILL COMPLY WITH 40 CFR 6.302(A) AND (B) CONCERNING THE LOCATION OF ANY TREATMENT SYSTEM ADDITIONS, AVOIDING THE CONSTRUCTION OF SUCH ADDITIONS IN A MANNER THAT WOULD HAVE AN ADVERSE IMPACT ON WETLANDS OR BE WITHIN A FLOOD PLAIN.

THE REGULATIONS AT 40 CFR 230 WERE REVIEWED AND DETERMINED NOT TO BE APPLICABLE WITHIN THE CONTEXT OF THIS IRA BECAUSE NO DISCHARGE OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES WILL OCCUR. BECAUSE THESE REGULATIONS ADDRESS ONLY THE DISPOSAL OF SUCH MATERIALS INTO THE WATERS OF THE UNITED STATES, WHICH IS NOT CONTEMPLATED, THEY ARE NOT CONSIDERED TO BE RELEVANT AND APPROPRIATE TO APPLY IN THE CONTEXT OF THIS IRA.

THE REGULATIONS AT 33 CFR 320-330 WERE REVIEWED AND DETERMINED TO BE NEITHER APPLICABLE NOR RELEVANT AND APPROPRIATE BECAUSE THEY ADDRESS ACTIONS AFFECTING THE WATERS OF THE UNITED STATES. NO SUCH ACTIONS ARE CONTEMPLATED WITHIN THE CONTEXT OF THIS IRA.

ACTION-SPECIFIC ARARS

DESCRIPTION

PERFORMANCE, DESIGN, OR OTHER ACTION-SPECIFIC REQUIREMENTS SET CONTROLS OR RESTRICTIONS ON ACTIVITIES RELATED TO THE MANAGEMENT OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS. THESE ACTION-SPECIFIC REQUIREMENTS MAY SPECIFY PARTICULAR PERFORMANCE LEVELS, ACTIONS, OR TECHNOLOGIES AS WELL AS SPECIFIC LEVELS (OR A METHODOLOGY FOR SETTING SPECIFIC LEVELS) FOR DISCHARGED OR RESIDUAL CHEMICALS.

CONSTRUCTION OF TREATMENT SYSTEM

AIR EMISSIONS

ON THE REMOTE POSSIBILITY THAT THERE MAY BE AIR EMISSIONS DURING THE COURSE OF THE CONSTRUCTION OF THIS TREATMENT SYSTEM, THE ARMY HAS REVIEWED ALL POTENTIAL AMBIENT OR CHEMICAL-SPECIFIC AIR EMISSION REQUIREMENTS. AS A RESULT OF THIS REVIEW, THE ARMY FOUND THAT THERE ARE, AT PRESENT, NO NATIONAL OR STATE AMBIENT AIR QUALITY STANDARDS CURRENTLY APPLICABLE OR RELEVANT AND APPROPRIATE TO ANY OF THE VOLATILE OR SEMIVOLATILES CHEMICALS IN THE GROUND WATER FOUND IN THE AREA IN WHICH CONSTRUCTION IS CONTEMPLATED.

IN THE CONTEXT OF THIS IRA, THERE IS ONLY A VERY REMOTE CHANCE OF ANY RELEASE OF VOLATILES OR SEMIVOLATILES AND, EVEN IF SUCH A RELEASE DID OCCUR, IT WOULD ONLY BE INTERMITTENT AND OF VERY BRIEF DURATION (BECAUSE THE ACTIVITY THAT PRODUCED THE RELEASE WOULD BE STOPPED AND MODIFIED APPROPRIATELY IF A SIGNIFICANT AIR EMISSION WAS DETECTED BY THE CONTRACTOR'S AIR MONITORING SPECIALIST). THE ARMY HAS SIGNIFICANT EXPERIENCE WITH THE CONSTRUCTION OF EXTRACTION AND REINJECTION WELLS AND HAS NOT EXPERIENCED ANY PROBLEMS FROM AIR EMISSIONS DURING CONSTRUCTION OF SUCH FACILITIES. THE SITE-SPECIFIC HEALTH AND SAFETY PLAN WILL ADEQUATELY ADDRESS THESE CONCERNS. THIS PLAN TO BE DEVELOPED FOR USE IN THE IRA WILL DETAIL OPERATIONAL MODIFICATIONS TO BE IMPLEMENTED IN THE EVENT MONITORING DETECTS SPECIFIC LEVELS, DEFINED IN THIS PLAN, OF SUCH EMISSIONS.

THE NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) WERE EVALUATED TO DETERMINED WHETHER THEY WERE APPLICABLE OR RELEVANT

AND APPROPRIATE TO APPLY IN THE CONTEXT OF CONSTRUCTION OF THIS IRA. THESE STANDARDS WERE NOT CONSIDERED APPLICABLE BECAUSE THEY APPLY TO STATIONARY SOURCES OF THESE POLLUTANTS, NOT TO CONSTRUCTION ACTIVITY. THESE STANDARDS WERE NOT CONSIDERED RELEVANT AND APPROPRIATE BECAUSE THEY WERE DEVELOPED FOR MANUFACTURING PROCESSES, WHICH ARE SIGNIFICANTLY DISSIMILAR TO THE SHORT-TERM CONSTRUCTION ACTIVITY CONTEMPLATED BY THIS IRA.

THE PROVISIONS OF 40 CFR 50.6 WILL BE CONSIDERED RELEVANT AND APPROPRIATE. THIS STANDARD IS NOT APPLICABLE BECAUSE IT ADDRESSES AIR QUALITY CONTROL REGIONS, WHICH ARE AREAS SIGNIFICANTLY LARGER THAN AND DIFFERENT FROM THE AREA OF CONCERN IN THIS IRA. PURSUANT TO THIS REGULATION, THERE WILL BE NO PARTICULATE MATTER TRANSPORTED BY AIR FROM THE SITE THAT IS IN EXCESS OF 75 MICROGRAMS PER CUBIC METER (ANNUAL GEOMETRIC MEAN) AND 260 MICROGRAMS PER CUBIC METER (MAXIMUM 24-HOUR CONCENTRATION) WILL BE EXCEEDED MORE THAN ONCE PER YEAR.

WORKER PROTECTION

THE PROVISIONS OF 29 CFR 1901.120 ARE APPLICABLE TO WORKERS AT THE SITE BECAUSE THESE PROVISIONS SPECIFICALLY ADDRESS HAZARDOUS SUBSTANCE RESPONSE OPERATIONS UNDER CERCLA. IT SHOULD BE NOTED THAT THESE ACTIVITIES ARE PRESENTLY GOVERNED BY THE INTERIM RULE FOUND AT 29 CFR 1910.120 BUT THAT BY THE TIME IRA ACTIVITY COMMENCES AT THE SITE, THE FINAL RULE FOUND AT 54 FR 9294 (MARCH 6, 1989) WILL BE OPERATIVE. (THE FINAL RULE BECOMES EFFECTIVE ON MARCH 6, 1990.)

GENERAL CONSTRUCTION ACTIVITIES

THE FOLLOWING PERFORMANCE, DESIGN, OR OTHER ACTION-SPECIFIC STATE ARARS HAVE BEEN PRELIMINARILY IDENTIFIED BY THE ARMY AS RELEVANT AND APPROPRIATE TO THIS PORTION OF THE IRA AND MORE STRINGENT THAN ANY APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL STANDARD, REQUIREMENT, CRITERION, OR LIMITATION. THESE STANDARDS ARE NOT APPLICABLE BECAUSE THEY SPECIFICALLY DO NOT ADDRESS A REMEDIAL ACTION OR CIRCUMSTANCE UNDER CERCLA:

COLORADO AIR POLLUTION CONTROL COMMISSION REGULATION NO. 1, 5 CCR 1001-3, PART III(D)(2)(B), CONSTRUCTION ACTIVITIES:

A. APPLICABILITY - ATTAINMENT AND NONATTAINMENT AREAS

B. GENERAL REQUIREMENT

ANY OWNER OR OPERATOR ENGAGED IN CLEARING OR LEVELING OF LAND OR OWNER OR OPERATOR OF LAND THAT HAS BEEN CLEARED OF GREATER THAN ONE (1) ACRE IN NONATTAINMENT AREAS FOR WHICH FUGITIVE PARTICULATE EMISSIONS WILL BE EMITTED SHALL BE REQUIRED TO USE ALL AVAILABLE AND PRACTICAL METHODS WHICH ARE TECHNOLOGICALLY FEASIBLE AND ECONOMICALLY REASONABLE IN ORDER TO MINIMIZE SUCH EMISSIONS, IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION III.D. OF THIS REGULATION.

C. APPLICABLE EMISSION LIMITATION GUIDELINE BOTH THE 20 PERCENT OPACITY AND THE NO OFF-PROPERTY TRANSPORT EMISSION LIMITATION GUIDELINES SHALL APPLY TO CONSTRUCTION ACTIVITIES; EXCEPT THAT WITH RESPECT TO SOURCES OR ACTIVITIES ASSOCIATED WITH CONSTRUCTION FOR WHICH THERE ARE SEPARATE REQUIREMENTS SET FORTH IN THIS REGULATION, THE EMISSION LIMITATION GUIDELINES THERE SPECIFIED AS APPLICABLE TO SUCH SOURCES AND ACTIVITIES SHALL BE EVALUATED FOR COMPLIANCE WITH THE REQUIREMENTS OF SECTION III.D. OF THIS REGULATION. (CROSS REFERENCE: SUBSECTIONS E. AND F. OF SECTION III.D.2 OF THIS REGULATION).

D. CONTROL MEASURES AND OPERATING PROCEDURES CONTROL MEASURES OR OPERATIONAL PROCEDURES TO BE EMPLOYED MAY INCLUDE BUT ARE NOT

NECESSARILY LIMITED TO PLANTING VEGETATION COVER, PROVIDING SYNTHETIC COVER, WATERING, CHEMICAL STABILIZATION, FURROWS, COMPACTING, MINIMIZING DISTURBED AREA IN THE WINTER, WIND BREAKS, AND OTHER METHODS OR TECHNIQUES.

COLORADO AMBIENT AIR QUALITY STANDARDS, 5 CCR 1001-14, AIR QUALITY REGULATION A, DIESEL-POWERED VEHICLE EMISSION STANDARDS FOR VISIBLE POLLUTANTS:

A. NO PERSON SHALL EMIT OR CAUSE TO BE EMITTED INTO THE ATMOSPHERE FROM ANY DIESEL-POWERED VEHICLE ANY AIR CONTAMINANT, FOR A PERIOD GREATER THAN 10 CONSECUTIVE SECONDS, WHICH IS OF SUCH A SHADE OR DENSITY AS TO OBSCURE AN OBSERVER'S VISION TO A DEGREE IN EXCESS OF 40 PERCENT OPACITY, WITH THE EXCEPTION OF SUBPART B BELOW.

B. NO PERSON SHALL EMIT OR CAUSE TO BE EMITTED INTO THE ATMOSPHERE FROM ANY NATURALLY ASPIRATED DIESEL-POWERED VEHICLE OF OVER 8,500 LBS GROSS VEHICLE WEIGHT RATING OPERATED ABOVE 7,000 FEET (MEAN SEA LEVEL), ANY AIR CONTAMINANT FOR A PERIOD OF 10 CONSECUTIVE SECONDS, WHICH IS OF A SHADE OR DENSITY AS TO OBSCURE AN OBSERVER'S VISION TO A DEGREE IN EXCESS OF 50 PERCENT OPACITY.

C. DIESEL-POWERED VEHICLES EXCEEDING THESE REQUIREMENTS SHALL BE EXEMPT FOR A PERIOD OF 10 MINUTES, IF THE EMISSIONS ARE A DIRECT RESULT OF A COLD ENGINE STARTUP AND PROVIDED THE VEHICLE IS IN A STATIONARY POSITION.

D. THIS STANDARD SHALL APPLY TO MOTOR VEHICLES INTENDED, DESIGNED, AND MANUFACTURED PRIMARILY FOR USE IN CARRYING PASSENGERS OR CARGO ON ROADS, STREETS, AND HIGHWAYS.

THE FOLLOWING PERFORMANCE, DESIGN, OR ACTION-SPECIFIC STATE ARAR IS APPLICABLE TO THIS PORTION OF THE IRA AND IS MORE STRINGENT THAN ANY APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL STANDARD, REQUIREMENT, CRITERION OR LIMITATION:

COLORADO NOISE ABATEMENT STATUTE, CRS SECTION 25-12-103:

A. EACH ACTIVITY TO WHICH THIS ARTICLE IS APPLICABLE SHALL BE CONDUCTED IN A MANNER SO THAT ANY NOISE PRODUCED IS NOT OBJECTIONABLE DUE TO INTERMITTENCE, BEAT FREQUENCY, OR SHRILLNESS. SOUND LEVELS OF NOISE RADIATING FROM A PROPERTY LINE AT A DISTANCE OF TWENTY-FIVE FEET OR MORE THERE FROM IN EXCESS OF THE DB(A) ESTABLISHED FOR THE FOLLOWING TIME PERIODS AND ZONES SHALL CONSTITUTE PRIMA FACIE EVIDENCE THAT SUCH NOISE IS A PUBLIC NUISANCE:

ZONE	7:00 AM TO NEXT 7:00 PM	7:00 PM TO NEXT 7:00 AM
RESIDENTIAL	55 DB(A)	50 DB(A)
COMMERCIAL	60 DB(A)	55 DB(A)
LIGHT INDUSTRIAL	70 DB(A)	65 DB(A)
INDUSTRIAL	80 DB(A)	75 DB(A)

B. IN THE HOURS BETWEEN 7:00 AM AND THE NEXT 7:00 PM THE NOISE LEVELS PERMITTED IN SUBSECTION (1) OF THIS SECTION MAY BE INCREASED BY TEN DB(A) FOR A PERIOD OF NOT TO EXCEED FIFTEEN MINUTES IN ANY ONE-HOUR PERIOD.

C. PERIODIC, IMPULSIVE, OR SHRILL NOISES SHALL BE CONSIDERED A PUBLIC NUISANCE WHEN SUCH NOISES ARE AT A SOUND LEVEL OF FIVE DB(A) LESS THAN THOSE LISTED IN SUBPART (A) OF THIS SECTION.

D. CONSTRUCTION PROJECTS SHALL BE SUBJECT TO THE MAXIMUM PERMISSIBLE NOISE LEVELS SPECIFIED FOR INDUSTRIAL ZONES FOR THE PERIOD WITHIN WHICH CONSTRUCTION IS TO BE COMPLETED PURSUANT TO ANY APPLICABLE CONSTRUCTION PERMIT ISSUED BY PROPER AUTHORITY OR, IF NO TIME LIMITATION IS IMPOSED,

FOR A REASONABLE PERIOD OF TIME FOR COMPLETION OF THE PROJECT.

E. FOR THE PURPOSE OF THIS ARTICLE, MEASUREMENTS WITH SOUND LEVEL METERS SHALL BE MADE WHEN THE WIND VELOCITY AT THE TIME AND PLACE OF SUCH MEASUREMENT IS NOT MORE THAN FIVE MILES PER HOUR.

F. IN ALL SOUND LEVEL MEASUREMENTS, CONSIDERATION SHALL BE GIVEN TO THE EFFECT OF THE AMBIENT NOISE LEVEL CREATED BY THE ENCOMPASSING NOISE OF THE ENVIRONMENT FROM ALL SOURCES AT THE TIME AND PLACE OF SUCH SOUND LEVEL MEASUREMENTS.

IN SUBSTANTIVE FULFILLMENT OF COLORADO AIR POLLUTION CONTROL COMMISSION REGULATION NO. 1, THIS IRA WILL EMPLOY THE SPECIFIED METHODS FOR MINIMIZING EMISSION FROM FUEL BURNING EQUIPMENT AND CONSTRUCTION ACTIVITIES. IN SUBSTANTIVE FULFILLMENT OF COLORADO'S DIESEL-POWERED VEHICLE EMISSION STANDARDS, NO DIESEL MOTOR VEHICLES ASSOCIATED WITH THE CONSTRUCTION SHALL BE OPERATED IN MANNER THAT WILL PRODUCE EMISSIONS IN EXCESS OF THOSE SPECIFIED IN THESE STANDARDS.

THE NOISE LEVELS PERTINENT FOR CONSTRUCTION ACTIVITY PROVIDED IN CRS SECTION 25-12-103 WILL BE ATTAINED IN ACCORDANCE WITH THIS APPLICABLE COLORADO STATUTE.

WETLANDS IMPLICATIONS

THROUGH ESTIMATION OF THE GENERAL AREA WHERE ANY SYSTEM ADDITIONS WILL BE LOCATED, THE ARMY DOES NOT BELIEVE THAT ANY WETLANDS COULD BE ADVERSELY AFFECTED. HOWEVER, UNTIL A FINAL DESIGN IS SELECTED AND A FINAL SITING DECISION MADE, IT CANNOT BE DEFINITIVELY DETERMINED THAT NO IMPACT ON WETLANDS WILL OCCUR. IF THE FINAL SITE SELECTION AND/OR DESIGN RESULTS IN AN IMPACT ON WETLANDS, THE ARMY WILL REVIEW THE REGULATORY PROVISIONS CONCERNING WETLANDS IMPACT AND OTHER APPROPRIATE GUIDANCE, AND WILL PROCEED IN A MANNER CONSISTENT WITH THOSE PROVISIONS. COORDINATION WILL BE MAINTAINED WITH THE US FISH AND WILDLIFE SERVICE CONCERNING ANY POTENTIAL IMPACTS ON WETLANDS.

LAND DISPOSAL RESTRICTIONS AND REMOVAL OF SOIL

THERE ARE NO ACTION-SPECIFIC ARARS THAT PERTAIN TO THE EXCAVATION OF SOIL DURING THE CONSTRUCTION OF THIS TREATMENT SYSTEM.

EPA IS CURRENTLY DEVELOPING GUIDANCE CONCERNING THE LAND DISPOSAL RESTRICTIONS (LDR). WHILE GUIDANCE IS LIMITED, THE ARMY HAS NOT DETERMINED THAT ANY LISTED WASTE SUBJECT TO LDR WILL BE PRESENT IN THE INFLUENT TREATED OR SOIL REMOVED BY THIS IRA. MORE LISTINGS ARE SCHEDULED TO BE COMPLETED PRIOR TO THE IMPLEMENTATION OF THIS IRA AND THE ARMY WILL REVIEW THESE AS THEY ARE RELEASED. IF IT IS DETERMINED THAT A LISTED WASTE SUBJECT TO LDR IS PRESENT, THE ARMY WILL ACT IN A MANNER CONSISTENT WITH EPA GUIDANCE FOR THE MANAGEMENT OF SUCH WITHIN THE CONTEXT OF CERCLA ACTIONS. SPENT GRANULATED ACTIVATED CARBON MAY BE SENT FOR REGENERATION, IF POSSIBLE, OR MAY BE DISPOSED OF CONSISTENT WITH EPA GUIDANCE IF UNABLE TO BE REGENERATED DUE TO THE PRESENCE OF CERTAIN CONSTITUENTS. ANY OFFSITE TRANSPORT OR DISPOSAL WILL BE CONSISTENT WITH THE MANAGEMENT REQUIREMENTS OF 40 CFR PARTS 262 AND 263 AND ANY MORE STRINGENT STATE REQUIREMENTS FOR OFFSITE.

ALTHOUGH REMOVAL OF SOIL FROM THE AREA WHERE ANY TREATMENT SYSTEM ADDITIONS WILL BE LOCATED IS A TBC, NOT AN ARAR, IT WILL BE PERFORMED IN ACCORDANCE WITH THE PROCEDURES SET FORTH IN THE TASK NO. 32 TECHNICAL PLAN, SAMPLING WASTE HANDLING (NOVEMBER 1987), AND EPA'S JULY 12, 1985, MEMORANDUM REGARDING "EPA REGION VIII PROCEDURE FOR HANDLING OF MATERIALS FROM DRILLING, TRENCH EXCAVATION AND DECONTAMINATION DURING CERCLA RI/FS OPERATIONS AT THE ROCKY MOUNTAIN ARSENAL". SOILS GENERATED

BY EXCAVATION DURING THE COURSE OF THIS IRA, EITHER AT SURFACE OR SUBSURFACE, MAY BE RETURNED TO THE LOCATION FROM WHICH THEY ORIGINATED (I.E. LAST OUT, FIRST IN). ANY MATERIALS REMAINING AFTER COMPLETION OF BACKFILLING THAT ARE SUSPECTED OF BEING CONTAMINATED (BASED ON FIELD SCREENING TECHNIQUES) WILL BE PROPERLY STORED, SAMPLED, ANALYZED, AND ULTIMATELY DISPOSED AS CERCLA HAZARDOUS WASTES CONSISTENT WITH THE EPA GUIDANCE THEN IN EFFECT, AS APPROPRIATE.

FOR MATERIAL DETERMINED TO BE HAZARDOUS WASTE RESULTING FROM CONSTRUCTION ACTIVITIES, SUBSTANTIVE RCRA PROVISIONS ARE APPLICABLE TO THEIR MANAGEMENT. THESE SUBSTANTIVE PROVISIONS INCLUDE BUT ARE NOT LIMITED TO: 40 CFR PART 262 (SUBPART C, PRETRANSPORT REQUIREMENTS), 40 CFR PART 263 (TRANSPORTER STANDARDS), AND 40 CFR PART 264 (SUBPART I, CONTAINER STORAGE AND SUBPART I, WASTE PILES). THE SPECIFIC SUBSTANTIVE STANDARDS APPLIED WILL BE DETERMINED BY THE FACTUAL CIRCUMSTANCES OF THE ACCUMULATION, STORAGE OR DISPOSAL TECHNIQUES ACTUALLY APPLIED TO ANY SUCH MATERIAL.

COMPLIANCE WITH THE OTHER ENVIRONMENTAL LAWS

AS IS EVIDENT FROM THE VARIOUS PORTIONS OF THIS DOCUMENT, THIS IRA WAS PREPARED IN SUBSTANTIVE COMPLIANCE WITH 40 CFR 1502.16 (THE REGULATIONS IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969).

#SCH
SCHEDULE

CONSISTENT WITH THE FEDERAL FACILITY AGREEMENT (1989) AND THE FINAL TECHNICAL PROGRAM PLAN FY88-FY92, THE MILESTONE FOR COMPLETING THE DRAFT IMPLEMENTATION DOCUMENT FOR THE RAIL CLASSIFICATION YARD IRA IS AUGUST 24, 1990. THE DEADLINE FOR COMPLETING THE IRA WILL BE ESTABLISHED IN THE IMPLEMENTATION DOCUMENT FOR THIS IRA BUT IS PRESENTLY SET AS FOR NOVEMBER 25, 1992.

CONSISTENCY WITH FINAL RESPONSE ACTION

THIS IRA WILL BE CONSISTENT WITH THE FINAL RESPONSE ACTION BY INTERCEPTING AND TREATING CONTAMINATED GROUNDWATER, THUS REDUCING THE SPREAD OF CONTAMINATION.

#RS
RESPONSIVENESS SUMMARY

APPENDIX A

RESPONSE TO COMMENTS FROM THE ENVIRONMENTAL PROTECTION AGENCY ON THE DRAFT APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE REMEDIATION OF OTHER CONTAMINATION SOURCES (RAILYARD AND LIME SETTLING BASINS) INTERIM RESPONSE ACTION

1. CONTAMINANTS PRESENT IN THE LIME SETTLING BASINS SOILS OR GROUNDWATER (REFER TO PAGES 2-8, 2-9, 2-11, AND 2-12 OF THE ASSESSMENT DOCUMENT) INCLUDE THE FOLLOWING:

A. ALDRIN
B. DIELDRIN
C. ENDRIN
D. ISODRIN
E. CHLOROPHENYL METHYL SULFIDE
F. CHLOROPHENYL METHYL SULFOXIDE
G. CHLOROPHENYL METHYL SULFONE
H. DCPD
I. DDE
J. DDT
K. DBCP
L. CHLOROFORM
M. METHYLENE CHLORIDE
N. BENZENE
O. CHLOROBENZENE
P. FLUOROACETIC ACID
Q. METHYLPHOSPHONIC ACID
R. ARSENIC
S. MERCURY
T. COPPER
U. LEAD
V. ZINC
W. CADMIUM
X. CHROMIUM
Y. TETRACHLOROETHENE
Z. TOLUENE
AA. XYLENE
BB. DICHLOROBENZENE
CC. TRICHLOROBENZENE
DD. TETRACHLOROBENZENE
EE. ENDRIN INTERMEDIATES: NOT SPECIFIED
FF. PAHS
    1. ANTHRACENE
    2. PYRENE
    3. FLUORANTHENE
    4. BYCYCLOHEPTADIENE
    5. HEXACHLOROBUTADIENE
    6. TRICHLOROBENZENAMINE
    7. METHYLSULFONYL DINITRO-N
    8. N-DIPROPYL-BENZENAMINE
GG. DIMP
HH. DMMP
II. DITHIANE
JJ. ARSINE

OF THE ABOVE COMPOUNDS, ARARS WERE ESTABLISHED FOR ONLY THE FOLLOWING CONTAMINANTS:

1. ARSENIC

2. BENZENE
3. CADMIUM
4. CHROMIUM
5. LEAD
6. MERCURY

WHILE TBCS WERE LISTED FOR ONLY CADMIUM, DBCP, AND LEAD.

IN ADDITION TO THESE COMPOUNDS, ARARS (EITHER MCLS OR AWQC) EXIST FOR AT LEAST THE FOLLOWING COMPOUNDS:

1. ALDRIN
2. DIELDRIN
3. ENDRIN
4. DDT
5. CHLOROFORM
6. COPPER
7. ZINC
8. TOLUENE
9. DICHLOROBENZENE

ADDITIONALLY, A HEALTH ADVISORY OF 600 PPB EXISTS FOR DIMP.

PLEASE EXPAND THE ARARS ANALYSIS TO INCLUDE HEALTH-BASED LEVELS FOR THOSE COMPOUNDS FOR WHICH NO ARARS WERE IDENTIFIED. THESE LEVELS MUST BE CONSIDERED IN THE FINAL ALTERNATIVE SELECTION.

RESPONSE: THIS DISCUSSION HAS BEEN REVISED. THE LIME SETTLING BASINS PROPOSED DECISION DOCUMENT DOES NOT INCLUDE GROUNDWATER TREATMENT WITHIN THE SELECTED TREATMENT ALTERNATIVE. THE RAIL CLASSIFICATION YARD PROPOSED DECISION DOCUMENT DOES ADDRESS SOME GROUNDWATER TREATMENT, BUT THIS TREATMENT IS SPECIFICALLY FOCUSED AND NOT INTENDED TO BE COMPREHENSIVE GROUNDWATER REMEDIATION, WHICH IS BEYOND THE SCOPE OF THIS IRA.

2. PAGE 2, SECOND PARAGRAPH, THE COLORADO GROUNDWATER STANDARDS, PROMULGATED IN AUGUST 1989, NEED TO BE EXAMINED TO SEE IF THEY ARE ARARS FOR ANY OF THE COMPOUNDS OF CONCERN (REFER TO COMMENT 1, ABOVE).

RESPONSE: THESE STANDARDS HAVE BEEN CONSIDERED, AS REFLECTED BY THE DISCUSSION IN THE PROPOSED DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD.

3. PAGE 3, LIST OF "TO-BE-CONSIDERED", THE ONLY CONTAMINANT FOR WHICH AN ARAR IS IDENTIFIED FOR THE RAIL YARD IRA IS FOR DBCP; HERE, THE LANGUAGE STATES THAT THE LEVEL FOR DBCP WILL BE ATTAINED "IF PRACTICABLE". THIS IS NOT A SATISFACTORY APPROACH. A COMMITMENT TO ACHIEVE THESE LEVELS TO THE MAXIMUM EXTENT PRACTICABLE IS NECESSARY.

RESPONSE: THIS SECTION HAS BEEN REVISED. HOWEVER, THE ARMY IS AWARE OF NO GUIDANCE IN THE PROPOSED NCP OR THE FEDERAL FACILITY AGREEMENT WHICH DIRECTS THAT TBCS BE ACHIEVED TO THE MAXIMUM EXTENT PRACTICABLE. THE PROPOSED NCP, IN DISCUSSING THIS MATTER, STATES "(TBCS) MAY ASSIST IN DETERMINING, FOR EXAMPLE, HEALTH-BASED LEVELS FOR A PARTICULAR CONTAMINANT FOR WHICH THERE ARE NO ARARS OR THE APPROPRIATE METHOD FOR CONDUCTING AN ACTION". PROPOSED NCP AT 54 FED. REG. 51436.

4. PAGE 3, AIR EMISSIONS, FIRST PARAGRAPH, AND PAGE 5, LAST PARAGRAPH, CHECK THE AQCR LANGUAGE USED PREVIOUSLY FOR OTHER IRA ARARS ANALYSES.

RESPONSE: THIS LANGUAGE HAS BEEN REVISED.

5. PAGE 4, PARAGRAPHS THREE AND FOUR, AND PAGE 9, TOP PARAGRAPH, IF THE

WILDLIFE PROTECTION AND WETLANDS ARE CONSIDERATIONS FOR THESE IRAS, PLEASE IDENTIFY THEM AS ARARS.

RESPONSE: THIS LANGUAGE HAS BEEN REVISED.

6. IF THE IRONDALE BOUNDARY CONTAINMENT SYSTEM (IBCS) OR ANY TREATMENT PLANT IS USED TO TREAT THE RAILYARD PLUME (DBCP PLUME), DRINKING WATER STANDARDS WOULD BE ARARS.

RESPONSE: THE IBCS IS CONSIDERED AS A WATER TREATMENT SYSTEM AS PART OF THE INTERIM RESPONSE SELECTED FOR THE RAILYARD. TREATMENT ARARS ARE IDENTIFIED IN THE PROPOSED DECISION DOCUMENT FOR THE RAIL CLASSIFICATION YARD.

7. LAND DISPOSAL RESTRICTIONS AND REMOVAL OF SOILS. THERE IS NO MENTION OF THE SPENT ACTIVATED CARBON (GAC) IN THIS SECTION. SPENT GAC COULD BE CLASSIFIED AS A HAZARDOUS WASTE AND WOULD HAVE TO BE HANDLED AS SUCH. SPENT GAC CONTAINING DBCP MIGHT NOT BE ACCEPTED FOR REACTIVATION AND WOULD NEED TO BE PROPERLY DISPOSED OF IN A RCRA STANDARD LANDFILL.

RESPONSE: THE PROPOSED DECISION DOCUMENT INCLUDES A DISCUSSION OF THIS MATTER.

8. ON PAGE 5, IF CONTAMINANTS SUBJECT TO NESHAPS ARE EMITTED IN QUANTITIES CONTEMPLATED BY THIS REGULATION, THE NESHAPS REGULATION SHOULD BE CONSIDERED RELEVANT AND APPROPRIATE AND BE INCLUDED AS AN ARAR.

RESPONSE: THE SELECTED TREATMENT APPROACHES FOR THE LIME SETTLING BASINS AND RAIL CLASSIFICATION YARD DO NOT INVOLVE TREATMENT SYSTEMS WHICH ARE SOURCES OF AIR EMISSIONS, SUCH AS AIR STRIPPERS, SO NO FURTHER RESPONSE IS PROVIDED.

RESPONSES TO COMMENTS FROM SHELL OIL COMPANY ON THE DRAFT APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE REMEDIATION OF OTHER CONTAMINATION SOURCES (RAIL CLASSIFICATION YARD AND LIME SETTLING BASINS)

SHELL DISAGREES WITH THE SELECTION OF MAXIMUM CONTAMINANT LEVELS (MCLS) AS RELEVANT AND APPROPRIATE TO THIS IRA. THE PREFERRED ALTERNATIVES FOR ADDRESSING TREATMENT OF CONTAMINATED SOILS FOR THE LIME BASINS MAY INVOLVE DISCHARGE OF THE WATER TO PERCOLATION BEDS. THIS TREATMENT IS NOT DESIGNED TO PROVIDE DRINKING WATER. IN THE ARMY ARARS DOCUMENT, THE ARMY ITSELF STATES THAT "THIS IRA WILL NOT PROVIDE DRINKING WATER AND NOT BE A PUBLIC WATER SYSTEM". SHELL, THEREFORE, OBJECTS TO SELECTION OF MCLS AS RELEVANT AND APPROPRIATE. SIMILARLY, IF THE PREFERRED ALTERNATIVES FOR TREATMENT OF THE DBCP PLUME FROM THE RAIL YARD ARE IMMEDIATELY DOWNGRADIENT OF THE SOURCE AREAS AND THE REINJECTED GROUNDWATER WILL BE TREATED AGAIN AT THE IRONDALE SYSTEM, MCLS SHOULD APPLY ONLY AT THE POINT WHERE HUMANS COULD BE EXPOSED TO THE GROUNDWATER. THIS POINT WOULD BE DOWNGRADIENT OF THE IRONDALE BOUNDARY, NOT AT THE POINT OF DISCHARGE OF TREATED WATER FROM ANY TREATMENT SYSTEM. IN SPITE OF SHELL'S OBJECTION TO SELECTION OF MCLS AS ARARS, SHELL DOES NOT OBJECT TO THE SELECTION OF THE CONCENTRATION LEVELS IDENTIFIED AS ARAR LEVELS AS OPERATIONAL CRITERIA.

RESPONSE: THE ARMY BELIEVES THAT THE USE OF MCLS AS RELEVANT AND APPROPRIATE ARARS AT THE POINT OF REINJECTION OF TREATED GROUNDWATER AND OTHER IDENTIFIED STANDARDS AS TBCS IS CONSISTENT WITH EPA GUIDANCE CONCERNING ARARS FOR AQUIFERS WHICH ARE POTENTIAL. DRINKING WATER SOURCES, PROPOSED NCP, 54 FED. REG. AT 51441.

SHELL DISAGREES THAT PROPOSED MCLS CAN BE SELECTED AS THE TBCS. THE CONCEPT OF TBCS IS NOT MANDATED BY SECTION 121(D) OF CERCLA. PROPOSED STANDARDS ARE PARTICULARLY SUSPECT SINCE THE PURPOSE OF PROPOSED

RULEMAKING IS TO RECEIVE COMMENTS PRIOR TO FINALIZATION OF STANDARDS. SHELL ALSO DISAGREES WITH THE PROPOSED STANDARDS FOR DBCP AND LEAD BECAUSE THEY ARE BASED ON CAG METHODOLOGY. IT INCORPORATES THE ATTACHED COMMENTS ON THE PROPOSED MCL FOR DBCP.

RESPONSE: THE ARMY IS AWARE OF SHELL'S POSITION CONCERNING CAG METHODOLOGY AND CONSIDERS THIS AN ISSUE WHICH SHELL, IF THEY DESIRE, SHOULD PURSUE WITH THE APPROPRIATE DIVISIONS WITHIN EPA HEADQUARTERS WHICH HAVE RESPONSIBILITY FOR DEVELOPING METHODOLOGY FOR STANDARD SETTING. THE ARMY WILL CONTINUE TO FOLLOW THE STANDARDS DEVELOPED BY EPA AND APPLY EPA GUIDANCE IN DEVELOPING APPROACHES TO THE ARSENAL CLEANUP. THE ARMY BELIEVES THAT USE OF PROPOSED MCLS AS TBCS IS CONSISTENT WITH CURRENT EPA GUIDANCE, AS REFLECTED IN THE PROPOSED NCP.

SHELL SUPPORTS THE SELECTION OF 40 CFR S6.302(A) AND (B) CONCERNING THE LOCATION OF ANY TREATMENT SYSTEM TO AVOID THE CONSTRUCTION OF SUCH SYSTEM IN A MANNER THAT WOULD HAVE AN ADVERSE IMPACT ON WETLANDS OR BE WITHIN A FLOOD PLAIN.

RESPONSE: NO RESPONSE NECESSARY.

THE ASSESSMENT DOCUMENTS ARE UNCLEAR REGARDING HOW ANY OF THE PREFERRED ALTERNATIVES WILL GENERATE PARTICULATES THAT WOULD NOT BE CONTROLLED BY THE REQUIREMENTS OF REGULATION 1, 5 CCR 100-3, PART III(D) (2) (B), CONSTRUCTION ACTIVITIES, WHICH IS ALSO SELECTED AS AN ARAR. WHILE SHELL DOES NOT DISAGREE WITH COMPLIANCE WITH THE PARTICULATE AIR STANDARD SET FORTH IN 40 CFR S50.6, IT FAILS TO UNDERSTAND HOW THE STANDARD IS RELEVANT AND APPROPRIATE.

RESPONSE: THE CITED STATE REGULATION ADDRESSES CONSTRUCTION ACTIVITIES IN GENERAL WHILE THE CITED FEDERAL REGULATION ESTABLISHES SPECIFIC REQUIREMENTS FOR PARTICULATES, A CONCERN IN THE GENERAL AREA IN WHICH THIS SITE IS LOCATED. UNDER THESE CIRCUMSTANCES THE ARMY BELIEVES IT IS APPROPRIATE TO COMPLY WITH BOTH REGULATIONS.

SHELL AGREES THAT THE REQUIREMENTS OF 29 CFR S1909.120 APPLY TO WORKERS, WHETHER OR NOT THOSE REQUIREMENTS ARE ARARS.

RESPONSE: NO RESPONSE NECESSARY.

THE COLORADO AMBIENT AIR QUALITY STANDARDS, AIR QUALITY REGULATION A, "DIESEL-POWERED VEHICLE EMISSION STANDARDS FOR VISIBLE POLLUTANTS," IS ONLY AN ARAR TO THE EXTENT THAT MOTOR VEHICLES MAY CARRY PASSENGERS OR CARGO ON ROADS, STREETS AND HIGHWAYS OFFPOST.

RESPONSE: THE ARMY AGREES WITH THIS COMMENT.

SHELL SUPPORTS THE PROPOSAL OF CRS S25-12-103, NOISE ABATEMENT, AS AN ARAR.

RESPONSE: NO RESPONSE NECESSARY.

SHELL FURTHER SUPPORTS THE DECISION TO REVIEW REGULATORY PROVISIONS CONCERNING WETLANDS IMPACT AND OTHER APPROPRIATE GUIDANCE IF THE FINAL SITE SELECTION AND/OR DESIGN RESULTS IN AN IMPACT ON WETLANDS. SHELL RESERVES THE RIGHT TO COMMENT ON THOSE REGULATORY PROVISIONS AND GUIDANCE AT THE TIME THAT THEY ARE PROPOSED.

RESPONSE: NO RESPONSE NECESSARY.

SHELL RESERVES THE RIGHT TO COMMENT ON HOW ANY SUBSTANTIVE RCRA STANDARDS MAY BE APPLIED TO THE ACCUMULATION, STORAGE OR DISPOSAL TECHNIQUES OF MATERIALS DETERMINED TO BE HAZARDOUS WASTE RESULTING FROM CONSTRUCTION ACTIVITIES.

RESPONSE: NO RESPONSE NECESSARY.

SHELL FURTHER RESERVES THE RIGHT TO COMMENT ON ANY PROVISIONS OF PARTS 264, 241, OR 262 THAT ARE CONSIDERED AS ARARS. UNTIL THE PREFERRED ALTERNATIVES ARE DESCRIBED IN MORE DETAIL, IT IS IMPOSSIBLE TO DETERMINE WHICH, IF ANY, OF THE ABOVE REGULATIONS MAY BE APPLICABLE OR RELEVANT AND APPROPRIATE.

RESPONSE: NO RESPONSE NECESSARY.

APPENDIX B.

RESPONSES TO EPA COMMENTS ON THE PROPOSED DECISION DOCUMENT OTHER CONTAMINATION SOURCES IRA, RAIL CLASSIFICATION YARD, RMA

RESPONSES TO GENERAL COMMENTS

COMMENT: THE TEXT STATES THAT ARARS WILL BE ACHIEVED "TO THE MAXIMUM EXTENT PRACTICABLE". A DECISION DOCUMENT MUST SELECT ARARS AND IDENTIFY HOW THEY WILL BE ACHIEVED OR WHY THEY ARE NOT PRACTICABLE. UNTIL SUCH A SELECTION IS MADE, WE RESERVE THE RIGHT TO COMMENT FURTHER.

RESPONSE: NO COMMENT REQUIRED.

COMMENT: THE PREFERRED ALTERNATIVE IS A LINE OF EXTRACTION WELLS (FOUR IN THE DIAGRAM, PAGE 36), APPROXIMATELY 200 FEET APART, AND PARALLEL TO THE GROUNDWATER FLOW DIRECTION COMBINED WITH A LINE OF RECHARGE WELLS (SIX IN THE DIAGRAM, PAGE 36), APPROXIMATELY 100 FEET APART, AND PERPENDICULAR TO THE APPARENT GROUNDWATER FLOW DIRECTION, INSTALLED WITHOUT A SUBSURFACE PHYSICAL BARRIER.

THE DESIGN OF THE SELECTED ALTERNATIVE MAY NEED TO BE MODIFIED BASED ON FIELD OBSERVATIONS FOLLOWING INSTALLATION OF INITIAL WELLS. THE RECHARGE WELLS MUST EFFECTIVELY PROVIDE A "LINE-RECHARGE-TO-A-LINEAR-SINK" (UPGRADIENT); THUS, A HYDRAULIC BARRIER AND THE EXTRACTION WELLS MUST EFFECTIVELY PROVIDE A "DOUBLE-LINE-SOURCE-TO-SLOT" SUCH THAT THE DOUBLE LINE SOURCE EXTENDS TO THE NORTHEAST AND THE SOUTHWEST BEYOND THE LIMITS OF THE PLUME AND THE SOURCES. IT IS QUESTIONABLE WHETHER 4 WELLS, 200 FEET APART, CAN ACCOMPLISH THIS EFFECT, PARTICULARLY TO THE NORTHEAST OF THE WELL ALIGNMENT SHOWN ON FIGURE 4-4, WITH THE WELLS BEING PUMPED AT LESS THAN 40 GPM EACH.

RESPONSE: APPROPRIATE ANALYSES WILL BE PERFORMED DURING THE DESIGN PHASE OF THE IRA IN ORDER TO DETERMINE AN EFFECTIVE DESIGN FOR THE INTERCEPTION SYSTEM. THE NUMBER AND LOCATION OF THE REQUIRED EXTRACTION AND RECHARGE WELLS WILL BE DETERMINED DURING THE DESIGN PHASE. INCLUDED IN THE DESIGN ANALYSES WILL BE CONSIDERATION OF THE EFFECTS OF INTEGRATING THE PROPOSED MOTOR POOL IRA GROUNDWATER INTERCEPTION SYSTEM. THE NUMBER AND LOCATION OF THE EXTRACTION WELLS SHOWN IN THE PROPOSED DECISION DOCUMENT WERE INTENDED TO BE ILLUSTRATIVE OF THE GENERAL CONCEPT AND FOR COST COMPARISON PURPOSES, AND WERE NOT TO BE CONSIDERED THE FINAL DESIGN.

RESPONSES TO SPECIFIC COMMENTS

COMMENT: ON PAGE 2, SECOND PARAGRAPH, THE STATEMENT "APPLICABLE RELEVANT AND APPROPRIATE REGULATIONS (ARARS)" SHOULD READ APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS.

THE TEXT LISTS SIX CRITERIA USED TO ASSESS ALTERNATIVE STRATEGIES WHICH ARE NOT THE SAME AS THOSE PRESENTED IN THE ASSESSMENT DOCUMENT. CRITERIA SHOULD BE THE SAME AT BOTH THE ASSESSMENT AND DECISION DOCUMENT STAGES.

RESPONSE: THE WORDING IN THE TEXT HAS BEEN CORRECTED TO READ APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS.

IT IS FELT THAT THE APPROPRIATE ASSESSMENT CRITERIA FOR USE IN THE DECISION DOCUMENT ARE THOSE LISTED IN SECTIONS 22.5, 22.6, AND 22.7 OF THE FEDERAL FACILITY AGREEMENT. THE SIX CRITERIA LISTED IN THE PROPOSED DECISION DOCUMENT ARE TAKEN FROM THESE SECTIONS OF THE FFA. UNFORTUNATELY, THE CRITERIA LISTED IN THE ALTERNATIVES ASSESSMENT WERE

SLIGHTLY DIFFERENT. NEVERTHELESS, THE DIFFERENCES IN CRITERIA ARE NOT FELT TO HAVE EFFECTED THE CHOICE OF THE SELECTED ALTERNATIVE.

COMMENT: THE TEXT APPEARS TO FAVOR ALLOWING NATURAL FORCES TO MOVE CONTAMINANTS FROM CONTAMINATED SOILS INTO THE GROUNDWATER WHERE THE CONTAMINANTS CAN BE CAPTURED AND DEALT WITH. WITHOUT FURTHER DEFINITION OF THE DEGREE OF SOIL CONTAMINATION, A PUMP AND TREAT PROGRAM COULD GO ON INDEFINITELY. BECAUSE THE IRA PLANS TO USE THE GROUNDWATER AS A MEANS TO CAPTURE CONTAMINANTS, AN ALTERNATIVE THAT WOULD FACILITATE FLUSHING OF CONTAMINATED SOILS SHOULD BE CONSIDERED. THE PROPOSED ALTERNATIVE HAS REINJECTION OF TREATED WATER DOWNGRADIENT OF THE EXTRACTION WELLS. REINJECTION UPGRADIENT OR INTO THE CONTAMINATED SOILS HAS THE POTENTIAL OF FLUSHING THE CONTAMINANTS AND DECREASING THE REMEDIATION TIME. EPA REQUESTS THE EVALUATION AND DISCUSSION OF THESE OPTIONS IN THE DRAFT FINAL DECISION DOCUMENT. ADDITIONALLY, WE REQUEST INFORMATION ON THE PARTITIONING COEFFICIENT WHICH MAY EFFECT THE SUCCESS OF THIS SUGGESTED REINJECTION OPTION.

RESPONSE: SECTION 4.1.3 OF THE TEXT HAS BEEN EXPANDED TO INCLUDE ADDITIONAL DISCUSSION OF THE OPTION OF FLUSHING CONTAMINANTS FROM THE RAILYARD SOILS. FOR THE REASONS DISCUSSED IN THE TEXT, SOIL FLUSHING IS NOT A PREFERRED ALTERNATIVE FOR THE RAIL CLASSIFICATION AREA IRA.

COMMENT: CONCERNING PAGES 23 AND 24, GROUNDWATER TREATMENT, THE ONLY TECHNOLOGY CONSIDERED FOR TREATMENT OF EXTRACTED GROUNDWATER IS GAC AT THE IRONDALE CONTROL SYSTEM (ICS). NO OTHER TREATMENT MEASURE IS MENTIONED DUE TO THE ASSUMPTION THAT "OTHER TREATMENT PROCESSES WOULD REQUIRE CONSIDERABLE LABORATORY TREATABILITY STUDIES . . ." THIS STATEMENT IS NOT SUBSTANTIATED AND QUESTIONABLE GIVEN THE NUMEROUS OTHER PROVEN WATER TREATMENT TECHNOLOGIES (E.G., UV LIGHT, OZONE, ETC.). NEITHER THE ALTERNATIVES ASSESSMENT NOR THE DECISION DOCUMENT ADDRESS THE ISSUE OF WHETHER THE IRONDALE SYSTEM CAN ADEQUATELY TREAT THE VOLUME OR CONCENTRATIONS EXPECTED FROM THE EXTRACTION SYSTEM. THE BASIS FOR SUCH CONCLUSIONS SHOULD BE DOCUMENTED IN THE RECORD.

ON PAGE 24, LAST PARAGRAPH, THE TEXT INDICATES THAT THE ICS "MAY BE ABLE TO TREAT UP TO 300 GPM". USE OF THE ICS IS INTEGRAL TO THE SELECTED ALTERNATIVE. WE REQUEST FURTHER DETAILS OF THE ANTICIPATED CONTAMINANT CONCENTRATION LEVELS TO BE TREATED AT THE ICS AND ASSURANCE THAT THE ICS HAS SUFFICIENT CAPACITY.

RESPONSE: THE ESTIMATED FLOW OF GROUNDWATER WITHIN THE LIMITS OF THE IDENTIFIED DBCP PLUME IS SLIGHTLY OVER 100 GPM. BASED ON THE AVAILABLE DATA, THE AVERAGE CONCENTRATIONS OF DBCP WITHIN THIS PLUME ARE EXPECTED TO PROBABLY BE BETWEEN 1 AND 5 UG/L. THE ACTUAL CONCENTRATION OF DBCP THAT WILL BE PUMPED BY THE INTERCEPTION SYSTEM WILL BE INFLUENCED BY THE AMOUNT OF DILUTION FROM TREATED WATER THAT RECIRCULATES BETWEEN THE RECHARGE AND EXTRACTION SYSTEMS. SYSTEM DESIGN AND OPERATION WILL EFFECT THE AMOUNT OF THIS RECIRCULATION. THE PROPOSED MOTOR POOL IRA INTERCEPTION SYSTEM IS EXPECTED TO PRODUCE A WASTE STREAM OF ROUGHLY 100 TO 150 GPM, WITH AVERAGE TCE LEVELS OF PROBABLY LESS THAN 5 UG/L. ADDITIONAL DATA ARE CURRENTLY BEING OBTAINED IN BOTH THE RAILYARD AND MOTOR POOL AREAS TO ALLOW A MORE ACCURATE DETERMINATION OF THE WASTE STREAM CONCENTRATIONS AND FLOWS.

AS DISCUSSED IN THE DECISION DOCUMENT, TREATMENT BY CARBON ADSORPTION OF WATERS CONTAMINATED BY DBCP AT THE LEVELS EXPECTED FROM THE RAILYARD GROUNDWATER INTERCEPTION SYSTEM HAS BEEN PROVEN EFFECTIVE AT OTHER TREATMENT SYSTEMS ON THE RMA. ACTIVATED CARBON ADSORPTION IS ALSO VERY EFFECTIVE IN REMOVING TCE. DESIGNING EITHER UV LIGHT OR OZONE TREATMENT SYSTEMS WITH SIMILAR RELIABILITY TO THAT ALREADY EXISTING IN THE ICS TREATMENT SYSTEM WOULD REQUIRE ADDITIONAL TIME FOR ANALYTICAL WORK AND TESTING. THE EXTRA TIME REQUIRED TO DESIGN AND TEST ANOTHER TREATMENT

TECHNOLOGY (E.G., UV LIGHT, OZONE, ETC.) DOES NOT SEEM WARRANTED IN LIGHT OF THE EXPERIENCE TREATING SIMILAR WASTE STREAMS ON THE RMA WITH CARBON ADSORPTION, ESPECIALLY CONSIDERING THE FACT THAT AN EXISTING ACTIVATED CARBON ADSORPTION SYSTEM (THE ICS) CAN PROBABLY BE UTILIZED WITH RELATIVELY MINOR MODIFICATIONS. USE OF THE ICS TREATMENT PLANT WILL ALSO REDUCE THE NEEDLESS PROLIFERATION OF TREATMENT PLANTS ON THE ARSENAL.

DURING THE DESIGN PHASE OF THE RAILYARD IRA, CAREFUL ATTENTION WILL BE GIVEN TO DETERMINING THE AVAILABLE CAPACITY AT THE ICS TREATMENT PLANT AND THE ANTICIPATED WASTE STREAMS FROM BOTH THE RAILYARD AND MOTOR POOL IRA GROUNDWATER INTERCEPTION SYSTEMS. IF THESE DESIGN-LEVEL EVALUATIONS SHOW THE IRS TREATMENT PLANT TO BE UNSUITABLE FOR TREATING THE WASTE STREAMS FROM THE TWO IRAS, IT IS ANTICIPATED THAT ADEQUATE CAPACITY CAN BE COST-EFFECTIVELY OBTAINED WITH APPROPRIATE MODIFICATIONS TO THE TREATMENT PLANT (ESTIMATED COSTS FOR SUCH IMPROVEMENTS WERE FACTORED INTO THE ANALYSES PRESENTED IN THE PROPOSED DECISION DOCUMENT). IF NOT, AS THE STATE OF COLORADO SUGGESTED IN A COMMENT, THE PLAN TO USE THE IRS TREATMENT PLANT COULD BE ALTERED.

4. COMMENT: THE ENDANGERED SPECIES ACT IS A LOCATION-SPECIFIC ARAR (SEE PAGE 52).

RESPONSE: THE ENDANGERED SPECIES ACT IS CONSIDERED AS A LOCATION-SPECIFIC ARAR AND IS LISTED IN THE DRAFT FINAL DECISION DOCUMENT.

5. COMMENT: NESHAPS SHOULD BE CONSIDERED AS RELEVANT AND APPROPRIATE TO THIS ACTIVITY (SEE PAGE 54).

RESPONSE: THE ARMY DISAGREES WITH THIS COMMENT. NESHAPS ARE NOT CONSIDERED TO BE RELEVANT AND APPROPRIATE BECAUSE THEY ARE DEVELOPED FOR SPECIFIC MANUFACTURING PROCESSES WHICH ARE SUBSTANTIALLY DISSIMILAR TO THE SHORT-TERM CONSTRUCTION PROCESS FOR THIS IRA. THE CONTEMPLATED TREATMENT SYSTEM DOES NOT INCLUDE AN AIR EMISSION SOURCE, SUCH AS AN AIR STRIPPING SYSTEM, SO NESHAPS WERE NOT CONSIDERED RELEVANT AND APPROPRIATE TO APPLY TO THE TREATMENT SYSTEM.

6. COMMENT: WETLANDS ARE A LOCATION-SPECIFIC ARAR, NOT AN ACTION-SPECIFIC ARAR (SEE PAGE 59).

RESPONSE: WETLANDS CONSIDERATIONS ARE IDENTIFIED AS A LOCATION-SPECIFIC ARAR IN THE DRAFT DECISION DOCUMENT. THEY ARE ALSO DISCUSSED AS AN ACTION-SPECIFIC ARAR BECAUSE WETLANDS CONSIDERATIONS COULD AFFECT ACTIONS TAKEN DURING CONSTRUCTION.

RESPONSE TO STATE COMMENTS ON THE PROPOSED DECISION DOCUMENT OTHER CONTAMINATION SOURCES IRA, RAIL CLASSIFICATION YARD, RMA

COMMENT: AN INTERCEPT AND RECHARGE SYSTEM (ONE OR MORE) FROM BOTH THE RAILYARD AND MOTOR POOL SHOULD BE EVALUATED AND DESIGNED IN CONCERT. THEREFORE, THE SPECIFIC APPROACH AND CONFIGURATION OF THE INTERCEPT SYSTEM SEEMS SOMEWHAT PREMATURE AT THIS POINT.

RESPONSE: ORIGINALLY, IT WAS FELT THAT EVALUATION OF SOME ALTERNATIVE GROUNDWATER INTERCEPTION SYSTEM CONFIGURATIONS WOULD BE MEANINGFUL IN THE ALTERNATIVES ASSESSMENT FOR THIS IRA. AS THIS IRA HAS PROGRESSED, IT HAS BECOME APPARENT THAT THE VALUE OF THESE PRELIMINARY EVALUATIONS HAS BEEN PRIMARILY LIMITED TO COMPARING GROUNDWATER CONTAINMENT WITH GROUNDWATER INTERCEPTION. THE VALUE OF EVALUATING VARYING GROUNDWATER INTERCEPTION SYSTEM CONFIGURATIONS HAS BEEN MINIMAL. DURING THE DESIGN PHASE OF THIS IRA, SOME OF THE CONCLUSIONS BASED ON THESE EVALUATIONS OF ALTERNATIVE GROUNDWATER INTERCEPTION SYSTEM CONFIGURATIONS WILL REQUIRE REASSESSMENT. AS MENTIONED IN THE PROPOSED DECISION DOCUMENT, IF ANY OF THE PRELIMINARY CONCLUSIONS DO NOT HOLD UP UNDER FURTHER SCRUTINY USING

DESIGN-LEVEL INFORMATION AND ANALYSIS, APPROPRIATE CONFIGURATION CHANGES WILL BE PROPOSED.

COMMENT:

THE DECISION TO CHOOSE THE IRONDALE CONTAINMENT SYSTEM (ICS) FOR TREATMENT, WITH OR WITHOUT MODIFICATION, MUST BE BASED ON THE CONSIDERATION OF THE WASTE STREAM (VOLUME AND FLUX) FOR BOTH THE RAILYARD AND THE MOTOR POOL AREAS. SHELL LOOKED ONLY AT THE REQUIREMENTS FOR THE RAILYARD INTERCEPT SYSTEM. THE ARMY FAILED TO LOOK AT ICS REQUIREMENTS OR CAPACITIES FOR THE MOTOR POOL INTERCEPT SYSTEM. THE DECISION TO USE THE ICS (WITH OR WITHOUT MODIFICATION) FOR THE TREATMENT COMPONENT OF THE IRA MAY NEED TO BE ALTERED BASED ON CONSIDERING REQUIREMENTS OF BOTH SITES.

RESPONSE: DURING THE DESIGN PHASE OF THE RAILYARD IRA, CAREFUL ATTENTION WILL BE GIVEN TO DETERMINING THE AVAILABLE CAPACITY AT THE ICS TREATMENT PLANT AND THE ANTICIPATED WASTE STREAMS FROM BOTH THE RAILYARD AND MOTOR POOL IRA GROUNDWATER INTERCEPTION SYSTEMS. IF THESE DESIGN-LEVEL EVALUATIONS SHOW THE ICS TREATMENT PLANT TO BE UNSUITABLE FOR TREATING WASTE STREAMS FROM THE TWO IRAS, IT IS ANTICIPATED THAT ADEQUATE MODIFICATIONS TO THE TREATMENT PLANT (ESTIMATED COSTS OF SUCH IMPROVEMENTS WERE FACTORED INTO THE ANALYSES PRESENTED IN THE PROPOSED DECISION DOCUMENT). IF NOT, AS THE STATE SUGGESTS, THE PLAN TO USE THE ICS TREATMENT PLANT COULD BE ALTERED.

ARAR RESPONSES

COMMENT: PACE 49, PARA. 1 (8.2). SHELL STATES THAT THE ARARS IDENTIFIED WERE FOR ORGANIC CONTAMINANTS "EXPECTED TO BE CONTAINED IN THE INFLUENT RECEIVED BY THE IBS, INCLUDING INFLUENT RECEIVED FROM THE MOTOR POOL AREA . . . ". HOWEVER, THE LIST OF CONTAMINANTS SET OUT IN THE SHELL DOCUMENT CONTAIN FEW OF THE CONTAMINANTS FOUND IN THE MOTOR POOL GROUNDWATER. THE ARARS ANALYSIS SHOULD BE EXPANDED TO INCLUDE THOSE CONTAMINANTS.

RESPONSE: THE ARARS LISTED FOR THE ORGANIC COMPOUNDS CONTAINED IN THE INFLUENT EXPECTED TO BE TREATED BY THE IRONDALE BOUNDARY CONTAINMENT SYSTEM, INCLUDING INFLUENT WHICH ORIGINATES FROM THE MOTOR POOL AREA, ARE CONSISTENT WITH TABLE 2-2 OF THE FINAL ALTERNATIVES ASSESSMENT FOR THE MOTOR POOL AREA, EXCEPT FOR CHLOROFORM WHICH IS NOT ADDRESSED AT THIS TIME AND WHICH IS ALSO LISTED IN THE FINAL ALTERNATIVES ASSESSMENT AS RANGING ONLY UP TO 6.0 UG/L WHICH IS FAR BELOW THE STANDARD ESTABLISHED IN THE NPDW REGULATIONS.

COMMENT: PAGE 49. PARA. 4(8.2). SHELL STATES THAT, CONSISTENT WITH THE PROPOSED NATIONAL CONTINGENCY PLAN, MAXIMUM CONTAINMENT LEVEL GOALS CONTAINED IN THE NATIONAL PRIMARY WATER REGULATIONS ARE NOT CONSIDERED EITHER APPLICABLE OR RELEVANT AND APPROPRIATE.

HOWEVER, CERCLA ITSELF, WHICH IS MORE AUTHORITATIVE THAN A PROPOSED REGULATION, REQUIRES THAT REMEDIAL ACTIONS AT LEAVE (SIC) ACHIEVE MCLGS. MOREOVER, EVEN THE PROPOSED NCP DOES NOT CATEGORICALLY DISMISS MCLGS AS ARARS.

THE CONGRESSIONAL CONFEREES WHO DRAFTED S121 OF CERCLA (WHICH WAS PART OF THE 1986 CERCLA AMENDMENTS) HAVE BEEN EMPHATIC THAT CERCLA REMEDIAL ACTIONS ARE TO ACHIEVE MCLGS AS DISTINGUISHED FROM MCLS. A MARCH 27, 1987 LETTER FROM UNITED STATES REPRESENTATIVE JAMES FLORIO (AND OTHER COMMITTEE CONFEREES) TO LEE THOMAS, FORMER EPA ADMINISTRATOR, STATES:

IN ANY CIRCUMSTANCES IN WHICH MCLS ARE RELEVANT AND APPROPRIATE, MCLGS ARE EQUALLY RELEVANT AND APPROPRIATE. SECTION 121(D)(2)(A) STATES:

SUCH REMEDIAL ACTION SHALL REQUIRE A LEVEL OR STANDARD OF CONTROL WHICH AT LEAST ATTAINS MAXIMUM CONTAMINANT LEVEL GOALS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT AND WATER QUALITY CRITERIA ESTABLISHED UNDER S304 OR 303 OF THE CLEAN WATER ACT, WHERE SUCH GOALS OR CRITERIA ARE RELEVANT AND APPROPRIATE UNDER THE CIRCUMSTANCES OF THE RELEASE OR THREATENED RELEASE.

THE SPECIFIC REFERENCE TO MCLGS IN THE LAW MAKES IT CLEAR THAT THESE PARTICULAR STANDARDS, WHERE THEY ARE MORE STRINGENT THAT THE COMPARABLE MCLS, ARE THE PRIMARY STANDARDS THAT MUST BE ATTAINED BY SUPERFUND CLEANUPS OF GROUNDWATER.

THE REASON THE CONGRESS CHOSE TO SPECIFY MCLGS IS THAT UNDER THE SAFE DRINKING WATER ACT, THE DIFFERENCE BETWEEN THE TWO REQUIREMENTS CAN BE SIGNIFICANT. IN FORMULATING MCLS THE AGENCY CONSIDERS FEASIBILITY (AND ESPECIALLY COST) AS WELL AS HEALTH-BASED FACTORS. MCLS CONSEQUENTLY MAY OFFER SIGNIFICANTLY LESS PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THAN MCLGS.

RESPONSE: AS THE CITED STATUTORY LANGUAGE REFLECTS, MCLGS ARE TO BE ATTAINED WHERE THEY ARE DETERMINED RELEVANT AND APPROPRIATE (EMPHASIS ADDED). EPA, AS FEDERAL AGENCY RESPONSIBLE FOR IMPLEMENTING THE STATUTE, HAS ISSUED THE PROPOSED NCP IN ORDER TO IMPLEMENT THE STATUTE. EPA'S STATE POLICY, AS CITED IN THE PROPOSED NCP, IS THAT MCLS ARE GENERALLY RELEVANT AND APPROPRIATE AS CLEANUP STANDARDS. WHILE INDIVIDUAL MEMBERS OF THE FEDERAL LEGISLATURE MAY HAVE EXPRESSED DISAGREEMENT WITH EPA'S INTERPRETATION OF THE STATUTORY PROVISION, THIS DOSE NOT EFFECT VALIDITY OF EPA'S REGULATORY GUIDANCE. INDIVIDUAL FEDERAL AND STATE LEGISLATORS DO SOMETIMES DISAGREE WITH THE IMPLEMENTATION BY FEDERAL AND STATE AGENCIES OF PARTICULAR STATUTES. IF THE FEDERAL AND STATE LEGISLATURE, AS A BODY, DETERMINES THAT THE IMPLEMENTATION BY THE AGENCY IS NOT WHAT WAS INTENDED BY THE LEGISLATURE, THEY MAY ENACT FURTHER LEGISLATION TO CLARIFY THE STATUTE OR REDIRECT THE AGENCY. THE CITED EPA POLICY HAS BEEN IN EFFECT FOR SEVERAL YEARS AND NO LEGISLATIVE ACTION HAVE BEEN TAKEN TO REQUIRE CHANGE.

THE STATE ALSO APPEARS TO OVERLOOK THE FACT THAT THIS IS AN INTERIM RESPONSE ACTION, NOT THE FINAL RESPONSE ACTION. THERE IS NO LEGISLATIVE OR EPA GUIDANCE WHICH IMPLIES MCLGS SHOULD BE APPLIED TO SUCH INTERIM ACTIONS WHICH ARE CONDUCTED IN ADVANCE OF FINAL RESPONSE ACTIONS. AS THE PROPOSED NCP MAKES CLEAR, SITE SPECIFIC DETERMINATIONS CAN BE MADE THAT ESTABLISH DIFFERENT CLEANUP CRITERIA FOR THE SPECIFIC SITE. THE EXTENSIVE RI/EA/FS PROCESS IS DESIGNED TO PROVIDE THE BASIS FOR DETERMINING SITE SPECIFIC CRITERIA FOR FINAL RESPONSE ACTIONS AND THAT PROCESS IS UNDERWAY AT THE ARSENAL. FINAL CLEANUP CRITERIA BASED UPON THE RI/EA/FS PROCESS, WILL BE ESTABLISHED FOR THE ARSENAL CONSISTENT WITH THE CERCLA GUIDANCE DEVELOPED BY EPA.

COMMENT: PAGE 50, PARA. 3: (8.2). ALTHOUGH THE ARMY CONSIDERS MCLS "SUFFICIENTLY PROTECTIVE OF HUMAN HEALTH" THIS CONCLUSION IS UNSUPPORTED BY A RISK ANALYSIS. MANY MCLS, ARSENIC FOR EXAMPLE, REPRESENT EXCESS CANCER RISKS SIGNIFICANTLY GREATER THAN (10E-6). THE CONGRESS ACKNOWLEDGED THIS FACT AND FOR THIS REASON PROVIDED THAT CERCLA CLEANUPS SHOULD MEET MCLGS WHICH ARE STATUTORILY REQUIRED TO BE TRULY PROTECTIVE.

RESPONSE: SEE RESPONSE TO COMMENTS #2.

COMMENT: PAGE 51, PARA. 2 (8.2). SHELL STATES THAT TBC'S WILL BE MET "IF PRACTICABLE". IN RESPONSE TO AN EPA COMMENT ON THE ALTERNATIVE ASSESSMENT CALLING THE LANGUAGE AN UNSATISFACTORY APPROACH, THE ARMY STATED THAT THE SECTION HAD BEEN REVISED. SHELL SHOULD THEREFORE REVISE THE LANGUAGE. ONCE A STANDARD IS SELECTED, IT SHOULD BE MET TO THE MAXIMUM EXTENT PRACTICABLE.

RESPONSE: THE EPA COMMENT CITED WAS BROADER THAN THE SINGLE MATTER REFLECTED IN THE STATE'S COMMENT AND THE SECTION WAS REVISED IN RESPONSE TO THAT COMMENT. HOWEVER, THE ARMY DOES NOT BELIEVE THAT THERE IS A REQUIREMENT TO ATTAIN TBCS TO THE MAXIMUM EXTENT PRACTICABLE. THE ARMY IS AWARE OF NO GUIDANCE IN THE PROPOSED NCP OR THE FEDERAL FACILITY AGREEMENT WHICH DIRECTS THAT TBCS BE ACHIEVED TO THE MAXIMUM EXTENT PRACTICABLE. THE PROPOSED NCP, IN DISCUSSING THIS MATTER, STATES "(TBCS) MAY ASSIST IN DETERMINING, FOR EXAMPLE, HEALTH-BASED LEVELS FOR A PARTICULAR CONTAMINANT FOR WHICH THERE ARE NO ARARS OR THE APPROPRIATE METHOD FOR CONDUCTING AN ACTION". PROPOSED NCP AT 54 FED. REG. 51436.

COMMENT: PAGE 53. PARA. 3 (8.4). SHELL STATES THAT THE ARMY FOUND NO POTENTIAL AMBIENT AIR QUALITY STANDARDS CURRENTLY APPLICABLE OR RELEVANT AND APPROPRIATE TO ANY OF THE VOLATILE OR SEMIVOLATILE CHEMICALS FOUND IN THE GROUND WATER IN THE AREA OF CONTEMPLATED CONSTRUCTION. YET, SHELL STATES THAT THE SELECTED ALTERNATIVE WILL CONSIST OF A ROW OF ALLUVIAL EXTRACTION WELLS LOCATED ALONG THE CENTER AXIS OF THE DBCP PLUME. THEREFORE, SHELL SHOULD DO AN ARARS ANALYSIS OF POSSIBLE EMISSIONS FROM THE RAIL YARD SOILS, SUCH AS TRICHLOROETHYLENE.

RESPONSE: AS STATED IN THE DRAFT FINAL DECISION DOCUMENT, IN THE CONTEXT OF THIS IRA, THERE IS ONLY A VERY REMOTE CHANCE OF ANY RELEASE OF VOLATILES OR SEMI-VOLATILES AND, EVEN IF SUCH A RELEASE DID OCCUR, IT WOULD ONLY BE INTERMITTENT AND OF A VERY BRIEF DURATION (BECAUSE THE ACTIVITY THAT PRODUCED THE RELEASE WOULD BE STOPPED AND/OR MODIFIED APPROPRIATELY IF A SIGNIFICANT AIR EMISSION WAS DETECTED BY THE CONTRACTOR'S AIR MONITORING SPECIALIST). THE ARMY AND SHELL HAVE SIGNIFICANT EXPERIENCE WITH THE CONSTRUCTION OR EXTRACTION AND REINJECTION WELLS AND HAS NOT EXPERIENCED ANY PROBLEMS FROM AIR EMISSIONS DURING CONSTRUCTION OF SUCH FACILITIES.

THE ARMY IS NOT AWARE OF ANY PROMULGATED STANDARDS THAT ADDRESS THE EMISSION OF COMPOUNDS SUCH AS TCE TO THE AIR FROM ACTIVITIES WHICH ARE SIMILAR TO WELL CONSTRUCTION. THE SITE-SPECIFIC HEALTH AND SAFETY PLAN WILL ADEQUATELY ADDRESS THESE CONCERNS. THIS PLAN TO BE DEVELOPED FOR USE IN THE IRA WILL DETAIL OPERATIONAL MODIFICATIONS TO BE IMPLEMENTED IN THE EVENT MONITORING DETECTS SPECIFIC LEVELS OF SUCH EMISSIONS.

COMMENT: PAGE 53. PARA. 4 (8.4). SHELL STATES THAT ANY RELEASE OF VOLATILES OR SEMIVOLATILES DURING CONSTRUCTION WOULD BE OF A BRIEF DURATION SINCE THE ACTIVITY CAUSING THE EMISSION WOULD BE STOPPED IF A SIGNIFICANT AIR EMISSION WAS DETECTED THROUGH MONITORING. SHELL NEEDS TO DEFINE "SIGNIFICANT."

RESPONSE: THE SPECIFIC DETERMINATION WILL BE BASED UPON THE HEALTH AND SAFETY PLAN FOR CONSTRUCTION OF THIS PROJECT. THE DRAFT FINAL DECISION DOCUMENT REFLECTS THIS.

COMMENT: PAGE 54, PARA. 2 (8.4). SHELL DOES NOT CONSIDER NESHAPS RELEVANT OR APPROPRIATE BECAUSE THEY CONSIDER THE STANDARDS INAPPLICABLE TO CONSTRUCTION ACTIVITY. SHELL SHOULD CONSIDER NESHAPS RELEVANT AND APPROPRIATE IF THE CONTAMINANTS SUBJECT TO NESHAPS ARE EMITTED IN QUANTITIES CONTEMPLATED BY THE REGULATION.

RESPONSE: NESHAPS ARE PROCESS SPECIFIC STANDARDS, DEVELOPED FOR A NARROW RANGE OF ACTIVITY AND BASED UPON THE SPECIFICS OF THE IDENTIFIED PROCESS. THE CONSTRUCTION ACTIVITY CONTEMPLATED BY THIS IRA IS SO DISSIMILAR TO THE PROCESSES IDENTIFIED IN THE NESHAPS THAT THESE STANDARDS ARE NOT APPROPRIATE OR RELEVANT TO APPLY IN THE CONTEXT OF THIS IRA.

COMMENT: PAGE 54, PARA. 3 (8.4). SHELL STATES THAT THE PROVISIONS OF 40 CFR S50.6 ARE CONSIDERED RELEVANT AND APPROPRIATE. HOWEVER, SHELL

SHOULD ALSO CONSIDER COLORADO REGULATION 1, WHICH IS STRICTER THAN THE FEDERAL STANDARD. THE ARMY HAS ALSO MIS-STATED THE FEDERAL STANDARD. THE CORRECT FEDERAL STANDARD IS THAT NO PARTICULATE MATTER EXCEED 50 MICROGRAMS PER CUBIC METER, NOT 75, AS SHELL STATES. ALSO THE FEDERAL STANDARDS LISTS PARTICULATE EMISSION FOR A 24 HOUR AVERAGE AT 150 MICROGRAMS PER CUBIC METER.

RESPONSE: FUGITIVE PARTICULATE EMISSIONS REQUIREMENTS OF COLORADO REGULATION 1 WERE CONSIDERED. THE ARMY RECOGNIZES THIS REQUIREMENT AND WILL USE BEST PRACTICAL CONTROL TECHNOLOGY TO MINIMIZE SUCH EMISSIONS. THIS SECTION HAS BEEN REVISED TO REFLECT THE CURRENT STANDARD IN 40 CFR PART 50.6. THE DOCUMENT ALSO INCLUDES THE STATE'S SPECIFIC STANDARD IN REGULATION NO. 1 FOR CONSTRUCTION ACTIVITY.

COMMENT: PAGE 59, PARA. 3. SHELL STATE THAT SPENT GRANULATED ACTIVATED CARBON "MAY" BE DISPOSED OF CONSISTENT WITH EPA GUIDANCE IF UNABLE TO BE REGENERATED. THE SPENT GRANULATED ACTIVATED CARBON IS A HAZARDOUS WASTE SUBJECT TO THE RULES AND REGULATIONS UNDER CHWMA/RCRA.

RESPONSE: THIS LANGUAGE HAD BEEN CLARIFIED. THE SPENT GRANULATED ACTIVE CARBON, IF SENT FOR OFF-SITE DISPOSAL WILL BE MANAGED IN ACCORDANCE WITH APPROPRIATE REQUIREMENTS. IF IT IS CONSIDERED A HAZARDOUS WASTE IT WILL BE PROPERLY MANIFESTED AND DISPOSED OF.

COMMENT: PAGE 60, PARA. 3. THE ARMY STATES THAT THE IRA WAS PREPARED IN SUBSTANTIVE COMPLIANCE WITH 40 CFR S1502.16, THE REGULATIONS IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969. THE ARMY MUST ALSO BE IN COMPLIANCE WITH 32 CFR PT. 65 WHICH ARE DEPARTMENTS OF ARMY REGULATIONS DEALING SPECIFICALLY WITH NEPA REQUIREMENTS AT CERCLA SITES.

RESPONSE: THE ARMY IS PROCEEDING IN ACCORDANCE WITH THE REGULATIONS CONTAINED IN 32 CFR PART 651.

RESPONSES TO COMMENT FROM SHELL OIL COMPANY ON THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE REMEDIATION OF OTHER CONTAMINATION SOURCES (RAIL CLASSIFICATION YARD)

COMMENT: SHELL AGREES THAT CERTAIN MCLS SHOULD APPLY AT THE POINT OF DISCHARGE OF TREATED WATER FROM THE SELECTED TREATMENT SYSTEM, THE IRONDALE BOUNDARY SYSTEM (IBS). SHELL DISAGREES THAT PROPOSED MCLS CAN BE SELECTED AS TBCS. THE CONCEPT OF TBCS IS NOT MANDATED BY SECTION 121(D) OF CERCLA. PROPOSED STANDARDS ARE PARTICULARLY SUSPECT SINCE THE PURPOSE OF PROPOSED RULEMAKING IS TO RECEIVE COMMENTS PRIOR TO FINALIZATION OF STANDARDS. IN ADDITION, SHELL DISAGREES WITH THE STANDARDS FOR BENZENE, T-1, 2-DCE, TCE, DBCP, 1,1-DCE, AND 1,1,2-TCA BECAUSE THEY ARE DRIVEN BY CAG METHODOLOGY. FURTHER, THE TBC LEVELS FOR 1,1-DCE AND 1,1,2-TCA ARE BELOW THE GC/MS DETECTION LEVELS. SHELL HAS THE SAME COMMENTS REGARDING THE LAND DISPOSAL RESTRICTIONS AND THE RCRA PROVISIONS AS IT MADE FOR THE M-1 SETTLING BASINS.

RESPONSE: THE ARMY IS AWARE OF SHELL'S POSITION CONCERNING CAG METHODOLOGY AND CONSIDERS THIS AN ISSUE WHICH SHELL, IF THEY DESIRE, SHOULD PURSUE WITH THE APPROPRIATE DIVISIONS WITHIN EPA HEADQUARTERS WHICH HAVE RESPONSIBILITY FOR DEVELOPING METHODOLOGY FOR STANDARD SETTING. THE ARMY WILL CONTINUE TO FOLLOW THE STANDARDS DEVELOPED BY EPA AND APPLY EPA GUIDANCE IN DEVELOPING APPROACHES TO THE ARSENAL CLEANUP. THE ARMY BELIEVES THAT USE OF PROPOSED MCLS AS TBCS IS CONSISTENT WITH CURRENT EPA GUIDANCE, AS REFLECTED IN THE PROPOSED NCP. THE COMPOUNDS ABOUT WHICH SHELL EXPRESSES CONCERNS REGARDING DETECTION, BOTH HAVE SELECTED ARAR LEVELS, WHICH THE SYSTEM IS EXPECTED TO ATTAIN. THE ARMY APPRECIATES SHELL'S PROVISION OF THE COMMENTS THEY PROVIDED TO EPA CONCERNING THE APPLICABILITY OF LAND DISPOSAL RESTRICTIONS TO CERCLA RESPONSE ACTIONS. AS SHELL IS AWARE, GUIDANCE IN THIS AREA IS UNDER

DEVELOPMENT. THE ARMY WILL ACT CONSISTENTLY WITH THE GUIDANCE ISSUED BY EPA CONCERNING THIS ISSUE.

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TABLE 4-1

ESTIMATED COSTS OF ENCIRCLING DBCP SOURCES
WITH A PHYSICAL BARRIER

ASSUMPTIONS:

1) DESIGN FLOWRATE OF PUMPING SYSTEM IS 50 GPM.
2) SOIL BENTONITE SLURRY WALL IS USED FOR PHYSICAL BARRIER.
3) EXTRACTED WATER IS TREATED AND RECHARGED IN THE IRONDALE CONTROL SYSTEM.
4) COST OF CAPITAL FOR DETERMINING PRESENT VALUE OF ANNUAL COSTS IS 5 PERCENT PER ANNUM. ANNUAL COSTS ARE ASSUMED TO BEGIN AT THE BEGINNING OF THE YEAR.

CAPITAL COSTS

ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
1) SOIL-BENTONITE SLURRY WALL	SF	$ 6.00	310,000	$1,860,000
2) REMOVE AND REPLACE RAILROAD TRACKS	LF	$ 50.00	3,450	$ 172,500
3) GROUNDWATER EXTRACTION WELLS	EA	$17,000	2	$ 34,000
4) TRANSMISSION PIPING (3-INCH PVC)	LF	$ 10.00	9,500	$ 95,000
5) MONITORING WELLS	EA	$ 5,000	15	$ 75,000
			SUBTOTAL	$2,236,000
6) ENGINEERING DESIGN (20 PERCENT)				$ 447,000
7) SUPERVISION/GENERAL EXPENSE/OVERHEAD/ HEALTH AND SAFETY (30 PERCENT)				$ 671,000
8) GENERAL ADMINISTRATION (10 PERCENT)				$ 224,000
9) CONTINGENCY AND FEE (25 PERCENT)				$ 559,000
			TOTAL CAPITAL COST	$4,137,500

ANNUAL OPERATIONS AND MAINTENANCE COSTS

1) POWER COSTS TO PUMP 50 GPM TO IRONDALE CONTROL SYSTEM	$ 1,000
2) INCREMENTAL TREATMENT COSTS AT IRONDALE CONTROL SYSTEM	$ 5,500
3) QUARTERLY SAMPLING OF 10 MONITORING WELLS AT $1,500 PER SAMPLE	$60,000
TOTAL ANNUAL O&M COST	$66,500

PRESENT VALUE OF CAPITAL COSTS AND 5 YEARS OF O&M COSTS IS ESTIMATED TO BE $4,440,000.

TABLE 4-2

ESTIMATED COSTS OF AN INTERCEPTION SYSTEM
PERPENDICULAR TO CONTAMINANT FLOWPATH
WITHOUT A PHYSICAL BARRIER

ASSUMPTIONS:

1) DESIGN FLOWRATE IS 300 GPM.
2) EXTRACTED WATER IS TREATED IN THE IRONDALE CONTROL SYSTEM.
3) COST OF CAPITAL FOR DETERMINING PRESENT VALUE OF ANNUAL COSTS IS 5 PERCENT PER ANNUM. ANNUAL COSTS ARE ASSUMED TO OCCUR AT THE BEGINNING OF THE YEAR.

CAPITAL COSTS

ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
1) GROUNDWATER EXTRACTION WELLS	EA	$ 17,000	8	$ 136,000
2) GROUNDWATER RECHARGE WELLS	EA	$ 15,000	12	$ 180,000
3) DISTRIBUTION PIPING (3-INCH PVC)	LF	$ 10.00	1,500	$ 15,000
4) TRANSMISSION PIPING (TWO, 6-INCH PVC LINES)	LF	$ 27.00	9,000	$ 243,000
5) CONSTRUCTION OF ADDITIONAL MONITORING WELLS	EA	$ 5,000	25	$ 125,000
6) MODIFICATIONS TO IRONDALE CONTROL SYSTEM	LS	$510,000	1	$ 510,000
			SUBTOTAL	$1,209,000
7) ENGINEERING DESIGN (20 PERCENT)				$ 242,000
8) SUPERVISION/GENERAL EXPENSE/OVERHEAD/ HEALTH AND SAFETY (30 PERCENT)				$ 363,000
9) GENERAL ADMINISTRATION (10 PERCENT)				$ 121,000
10) CONTINGENCY AND FEE (25 PERCENT)				$ 302,000
			TOTAL CAPITAL COST	$2,237,000

ANNUAL OPERATIONS AND MAINTENANCE COSTS

1) POWER COSTS TO PUMP 300 GPM TO AND FROM IRONDALE CONTROL SYSTEM	$ 12,500
2) INCREMENTAL TREATMENT COSTS AT IRONDALE CONTROL SYSTEM	$ 37,000
3) QUARTERLY SAMPLING OF 25 MONITORING WELLS AT $1,500 PER SAMPLE	$ 150,000
TOTAL ANNUAL O&M COST	$ 199,500

PRESENT VALUE OF CAPITAL COSTS AND 5 YEARS OF O&M COSTS IS ESTIMATED TO BE $3,143,927.

TABLE 4-3

ESTIMATED COSTS OF AN INTERCEPTION SYSTEM
PERPENDICULAR TO CONTAMINANT FLOWPATH
WITH A PHYSICAL BARRIER

ASSUMPTIONS:

1) DESIGN FLOWRATE IS 200 GPM
2) EXTRACTED WATER IS TREATED IN THE IRONDALE CONTROL SYSTEM.
3) COST OF CAPITAL FOR DETERMINING PRESENT VALUE OF ANNUAL COSTS IS 5 PERCENT PER ANNUAL COSTS ARE ASSUMED TO OCCUR AT THE BEGINNING OF THE YEAR.

CAPITAL COSTS

ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
1) GROUNDWATER EXTRACTION WELLS	EA	$ 17,000	5	$ 85,000
2) GROUNDWATER RECHARGE WELLS	EA	$ 15,000	8	$120,000
3) DISTRIBUTION PIPING (3-INCH PVC)	LR	$ 10.00	1,500	$ 15,000
4) TRANSMISSION PIPING (TWO, 4-INCH PVC LINES)	LF	$ 19.00	9,000	$171,000
5) CONSTRUCTION OF ADDITIONAL MONITORING WELLS	EA	$ 5,000	25	$125,000
6) MODIFICATIONS TO IRONDALE CONTROL SYSTEM	LS	$510,000	1	$510,000
7) SOIL-BENTONITE SLURRY WALL (500 SF)	SF	$ 5.00	62,000	$310,000
			SUBTOTAL	$1,336,000
8) ENGINEERING DESIGN (20 PERCENT)				$ 267,000
9) SUPERVISION/GENERAL EXPENSE/OVERHEAD/ HEALTH AND SAFETY (30 PERCENT)				$ 401,000
10) GENERAL ADMINISTRATION (10 PERCENT)				$ 134,000
11) CONTINGENCY AND FEE (25 PERCENT)				$ 334,000
			TOTAL CAPITAL COST	$2,472,000

ANNUAL OPERATIONS AND MAINTENANCE COSTS

1) POWER COSTS TO PUMP 200 GPM TO AND FROM IRONDALE CONTROL SYSTEM	$ 18,000
2) INCREMENTAL TREATMENT COSTS AT IRONDALE CONTROL SYSTEM	$ 29,000
3) QUARTERLY SAMPLING OF 25 MONITORING WELLS AT $1,500 PER SAMPLE	$ 150,000
TOTAL ANNUAL O&M COST	$ 197,000

PRESENT VALUE OF CAPITAL COSTS AND 5 YEARS OF O&M COSTS IS ESTIMATED TO BE $3,368,000.

TABLE 4-4

ESTIMATED COSTS OF AN INTERCEPTION SYSTEM
PARALLEL TO CONTAMINANT FLOWPATH
WITHOUT A PHYSICAL BARRIER

ASSUMPTIONS:

1) DESIGN FLOWRATE IS 150 GPM.
2) EXTRACTED WATER IS TREATED IN THE IRONDALE CONTROL SYSTEM.
3) COST OF CAPITAL FOR DETERMINING PRESENT VALUE OF ANNUAL COSTS IS 5 PERCENT PER ANNUM. ANNUAL COSTS ARE ASSUMED TO OCCUR AT THE BEGINNING OF THE YEAR.

CAPITAL COSTS

ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
1) GROUNDWATER FRACTION WELLS	EA	$ 17,000	4	$ 68,000
2) GROUNDWATER RECHARGE WELLS	EA	$ 15,000	6	$ 90,000
3) DISTRIBUTION PIPING (3 INCH PVC)	LF	$ 10.00	2,500	$ 25,000
4) TRANSMISSION PIPING (TWO, 4 INCH PVC LINES)	SF	$ 19.00	9,000	$171,000
5) CONSTRUCTION OF ADDITIONAL MONITORING WELLS	EA	$ 5,000	25	$125,000
6) MODIFICATIONS TO IRONDALE CONTROL SYSTEM	LS	$510,000	1	$510,000
			SUBTOTAL	$989,000
7) ENGINEERING DESIGN (20 PERCENT)				$198,000
8) SUPERVISION/GENERAL EXPENSE/OVERHEAD/ HEALTH AND SAFETY (30 PERCENT)				$297,000
9) GENERAL ADMINISTRATION (10 PERCENT)				$ 99,000
10) CONTINGENCY AND FEE (25 PERCENT)				$247,000
			TOTAL CAPITAL COST	$1,830,000

ANNUAL OPERATIONS AND MAINTENANCE COSTS

1) POWER COSTS TO PUMP 150 GPM TO AND FROM IRONDALE CONTROL SYSTEM	$ 9,000
2) INCREMENTAL TREATMENT COSTS AT IRONDALE CONTROL SYSTEM	$ 24,000
3) QUARTERLY SAMPLING OF 25 MONITORING ILLS AT $1,500 PER SAMPLE	$ 150,000
TOTAL ANNUAL O&M COST	$ 183,000

PRESENT VALUE OF CAPITAL COSTS AND 5 YEARS OF O&M COSTS IS ESTIMATED TO BE $2,662,000.

TABLE 4-5

ESTIMATED COSTS OF AN INTERCEPTION SYSTEM
PARALLEL TO CONTAMINANT FLOWPATH
WITHOUT A PHYSICAL BARRIER

ASSUMPTIONS:

1) DESIGN FLOWRATE IS 150 GPM.
2) EXTRACTED WATER IS TREATED AND RECHARGED IN EXPANDED IRONDALE CONTROL SYSTEM FACILITIES.
3) COST OF CAPITAL FOR DETERMINING PRESENT VALUE OF ANNUAL COSTS IS 5 PERCENT PER ANNUM. ANNUAL COSTS ARE ASSUMED TO OCCUR AT THE BEGINNING OF THE YEAR.
4) RECHARGE IS ASSUMED TO OCCUR IN NEW RECHARGE WELLS INSTALLED NEAR THE ICS IF RECHARGE TRENCHES, PITS, OR LEACH FIELDS ARE UTILIZED, THE COSTS MAY DECREASE.

CAPITAL COSTS

ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	COST
1) GROUNDWATER EXTRACTION WELLS	EA	$ 17,000	4	$ 68,000
2) GROUNDWATER RECHARGE WELLS	EA	$ 15,000	6	$ 90,000
3) DISTRIBUTION PIPING (3-INCH PVC)	LF	$ 10.00	2,500	$ 25,000
4) TRANSMISSION PIPING (4-INCH PVC)	LF	$ 11.00	9,000	$ 99,000
5) CONSTRUCTION OF ADDITIONAL MONITORING WELLS	EA	$ 5,000	20	$ 100,000
6) MODIFICATIONS TO IRONDALE CONTROL SYSTEM	LS	$510,000	1	$ 510,000
7) SOIL-BENTONITE SLURRY WALL (700 LF)	SF	$ 5.00	78,000	$ 390,000
			SUBTOTAL	$1,282,000
8) ENGINEERING DESIGN (20 PERCENT)				$ 256,000
9) SUPERVISION/GENERAL EXPENSE/OVERHEAD/ HEALTH AND SAFETY (30 PERCENT)				$ 385,000
10) GENERAL ADMINISTRATION (30 PERCENT)				$ 128,000
11) CONTINGENCY AND FEE (25 PERCENT)				$ 321,000
			TOTAL CAPITAL COST	$2,372,000

ANNUAL OPERATIONS AND MAINTENANCE COSTS

1) POWER COSTS TO PUMP 50 GPM TO AND FROM IRONDALE CONTROL SYSTEM	$ 5,500
2) INCREMENTAL TREATMENT COSTS AT IRONDALE CONTROL SYSTEM	$ 24,000
3) QUARTERLY SAMPLING OF 20 MONITORING WELLS AT $1,500 PER SAMPLE	$ 120,000
TOTAL ANNUAL O&M COST	$ 149,500

PRESENT VALUE OF CAPITAL COSTS AND 5 YEARS OF O&M COSTS IS ESTIMATED TO BE $3,052,000.